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**World Maritime University**

**Malmö, Sweden**

**PROPOSAL FOR IMPROVING MARINE  
ENVIRONMENTAL PROTECTION  
MANAGEMENT IN THE KINGDOM OF  
CAMBODIA**

**By**

**ROATH SITH**

**Kingdom of Cambodia**

A dissertation submitted to the World Maritime University in partial  
fulfillment of the requirements for the award of the degree of

**MASTER OF SCIENCE**

in

**MARITIME ADMINISTRATION AND  
ENVIRONMENTAL PROTECTION (MAEP)**

August, 2000

## **Declaration**

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessary endorsed by the University.

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## **Abstract**

Title of Dissertation: **Proposal for Improving Marine Environmental Protection Management in the Kingdom Cambodia.**

Degree: **MSc.**

This dissertation is a study proposal to enhance marine environmental management in the Kingdom of Cambodia. The aims of this topic are to elaborate the current management system, national legislation, and the present and future risks to the marine environment.

A short view is concentrated on the overall environmental management system, basically the structure of the Ministry of Environment and other governmental institutions involved with the management of marine environment.

Economic factors, coastal and offshore development, inadequate legislation and institutional cooperation, and maritime transport activities cause present and future degradations to the marine environment. The relevant international conventions and agreements related to the marine environment have been considered to integrate the main concept into the national legislation, which is convenient for the sustainable use of marine resources and development.

Initial ideas for enhancing the marine environment such as the strengthening of the environmental management system, maritime administration, legal instruments, and development of a contingency plan for combating oil pollution have been highlighted. Centers for Environmental Education and for Marine Research and Development are required to be established for providing marine and environmental knowledge and information to the public and officials.

The conclusion analyzes the outcome of the Center for Environmental Education and the Center for Marine Research and Development after being established and the essential of a contingency plan for the protection of marine pollution, particularly oil spills from ships.

**KEYWORDS:** Contingency Plan, Convention, Environment, Legislation, Marine, Maritime Administration, and Pollution.

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## **Abbreviation**

BA	Buddhist Association
CEE	Center for Environmental Education
CLC	International Convention on Civil Liability for Oil Pollution Damage
CMRD	Center for Marine Research and Development
CPSC	Cambodia Port State Control
CSC & SAR	Division of Coastal State Control, and Search and Rescue
CSOR	Cambodia Ship Open Registry
DNCP/MOE	Department of Nature Conservation and Protection
EE	Environmental Education
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ETAP/UNDP	Environmental Technical Advisory Program/UNDP
FSC	Flag State Control
FUND	International Convention on the establishment of an International Fund for Compensation for Oil Pollution Damage.
HNS	International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea
IMDG Code	International Maritime Dangerous Goods Code.
IMO	International Maritime Organization
IMSCEE	Inter-Ministerial Steering Committee for Environmental Education
INTEVENTION	International Convention relating to Intervention on the High Seas in case of Oil Pollution Casualties
IOPC Fund	International Oil Pollution Compensation Fund
MAFF	Ministry of Agriculture, Fisheries and Forestry
MARPOL	International Convention for the Prevention of Pollution from Ships,

MCRA	Ministry of Cult and Religion Affair
MIME	Ministry of Industry Mines and Energy
MMD	Merchant Marine Department
MOE	Ministry of Environment
MOE/NEAP	MOE/National Environmental Action Plan
MOEYS	Ministry of Education, Youth and Sport
MPWT	Ministry of Public Work and Transport
NGOs	Non Governmental Organizations
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation
P/FSI	Division of Port/Flag States Implementation
PED	Provincial Environmental Department
PLA	Division of Planning and Legal Affairs
PSC	Port State Control
RSC	Division of Registration, Seaman and Certificate
SOLAS	International Convention on Save of Life at Sea
Tokyo MOU	Tokyo Memorandum of Understanding
UNCED	United Nations Convention on Environment and Development (Agenda 21)
UNCLOS 82	United Nations Convention on the Law of the Sea, 1982
UNDP	United Nation Development Program
UNEP	United Nations Environmental Program
USSR	Union of Soviet Socialist Republic

# **Chapter 1**

## **Introduction**

### **1.1 Topic Description**

Cambodia does not have a long coastline (see Appendix 1) but has rich fauna and flora. Destruction of this biodiversity is occurring every day caused by over-exploitation of marine resources, illegal hunting, negligent management, lack of regulations and enforcement, and lack of public awareness. A vast number of future development programs along the coastline such as oil and gas exploration and exploitation, port development, free trade zone and entertainment resorts have been considered and accepted by the government. Some development projects will start their own activities in 2000 (for example port construction), and other projects are expected to start their business in the near future.

The development of the coastline may generate some risks to the marine environment including water pollution by sewage and garbage, marine resources destruction by over exploitation and negligent management, oil spill pollution by ships and platform operations and by other maritime activities, which may occur at any time.

To be preventing of and responding to such pollution, in case it occurs, it is necessary to consider the current marine environmental management regime in Cambodia. Essential measurements must also be taken into account including the levels and kind of risks, available resources to be used, strategies to be applied and public participation in preventing and responding to marine pollution. Therefore, this dissertation will elaborate the above issues by highlighting the major risks to the

marine environment, both now and in the future, and propose ideas for improving the effectiveness of marine environmental management including proposals to accommodate all relevant international conventions into Cambodia's national environmental law.

## **1.2 Aims of dissertation**

The topic of this dissertation is “**A Proposal for Improving Marine Environmental Protection Management in the Kingdom of Cambodia**”. The objectives of this dissertation are the following:

- To highlight the current marine environmental management.
- To identify the major risks to the marine environment and problems facing marine environmental protection management.
- To examine and evaluate the effectiveness of the current environmental protection management structures and procedures.
- To consider all relevant international conventions and to propose new ideas for integrating them into the national environmental law.
- To offer proposals and recommendations for improving marine environmental protection management.

## **1.3 Relevant topics related to the field**

Six chapters and several subtitles with the support of some appendices, tables, and figures compose this dissertation. Chapter 1 is introduction. Chapter 2 is describing the overview of the current environmental management in Cambodia and other governmental institutions and agencies involved with marine environmental activities.

Analyses of current marine environmental threats and expected future risks to the marine environment are highlighted in chapter 3. This chapter will identify the causes of pollution generated from maritime activities and marine natural resources exploration and exploitation. Chapter 4 considers some relevant international conventions and treaties, which should be incorporated into Cambodian national

laws. The international conventions mentioned in this chapter are Marpol 73/78, London Dumping Convention, OPRC, CLC, HNS, Fund, Intervention Conventions, UNCED 92 (Agenda 21) and other international agreements.

Chapter 5 is a proposal for improving marine environmental protection management in Cambodia. Within this chapter, new ideas or initiatives on the marine environmental management will be raised. It will discuss the national regulations and enforcement, a proposal for developing human resources and its capacity building, and the contingency plan for combating and/or preventing marine pollution (by oil spill particularly) in case of an incident taking place. Finally, Chapter 6 consists of conclusion and recommendations to be applied for the sustainable use of marine resources and to ensure the quality of marine environment.

#### **1.4 Research methods and difficulties**

The information for writing this dissertation was based on materials from Cambodia, lectures delivered by the professors at World Maritime University and other visiting professors, data derived from various institutions, other sources retrieved from the Internet and by personal experiences when working for the government. Other pieces of information are based on personal interviews with governmental officers.

Collecting data for writing this dissertation faced many obstacles. Firstly, governmental institutions did not want to provide their documents because they are afraid of distributing them to public. Secondly, lots of documents were destroyed during the Pol Pot regime and new statistics were not published due to economic problems. Finally, environmental issues are a relatively new subject in Cambodia and there is no available data on that matter so far.

## **Chapter 2**

### **Overview of Environmental Management in Cambodia**

#### **2.1 Background**

The Royal Government of Cambodia considered the environmental issues in mid 1993. The issues of the environment was stated within the national constitution under article 59, describing that “the State shall protect the environment and balance of abundant natural resources and establish a precise plan of management of land, water, air, wind, geology, ecological system, mines, energy, petrol and gas, rocks and sand, gems, forests and forestry products, wildlife, fish and aquatic resources.” Therefore, having seen this Constitution the Ministry of Environment (MOE) was immediately established by the Royal Government of Cambodia in November 1993.

The ministry’s frameworks and its functions were determined under article 3 of the Sub-decree on the Organization and Functioning of the Ministry of Environment. The MOE is responsible for several functions and activities (listed under article 3 of the sub-decree on Organization and Functioning of the MOE) as mentioned in the following point.

- To exercise environmental policy with sustainable development and to propose the National and Regional Environmental Action Plans in cooperation with other ministries.
- To prepare and implement environmental legal instruments aiming to ensure sustainable development.
- To review and evaluate the Environmental Impact Assessment (EIA) of all proposed existing and on-going projects and activities, both public and private.

- To advise relevant ministries on the conservation, development, and management of natural resources as prescribed in Article 59 of the Constitution.
- To administer the National Project Areas System following the Royal Decree on the “Creation and Designation of Protected Areas” and to propose new areas to be put in the system.
- To prepare inventories, which describe the source, nature and amount of pollutants, and to take measures to prevent, reduce, and control environmental pollution.
- To prepare inspection procedures, as mentioned in Article 59 of the Law on Environmental Protection and Natural Resources Management.
- To prepare and conduct environmental educational programmes applying to all levels, including to local communities in cooperation with relevant ministries, national and international organizations.
- To compile, analyze and manage environmental data.
- To initiate and prepare any proposals to the Government to reach the goals of international agreements, conventions, and memorandum of understandings related to environmental protection, and to implement such international instruments.
- To promote incentives to those investments which facilitate environmental protection and nature conservation.
- To cooperate with National Organizations, NGOs, foreign governments and local communities in order to ensure the environmental protection in the Kingdom of Cambodia.

## **2.2 Structure of the MOE**

The management structure of the MOE is divided into central and provincial administrations. The central administration is the core ministry, which is composed of six main technical departments (see Figure 1). These departments are responsible for the environmental issues including environmental policy and legal affairs, environmental education, nature conservation and protection, pollution control

management, natural resources assessment and environmental data management, and environmental impact assessment (see Appendix 02 for detailed functions of each Department). The central environmental administration is responsible for the country's environmental management as a whole. Furthermore, the provincial administrations are located within 22 provinces and municipalities. The provincial and municipal administrations are called Provincial Environmental Department (PED), and they are responsible for provincial environmental management within their own territory, in particular.

## **2.3 Overview of environmental management in Cambodia**

It is not an easy job for this new ministry to carry out the environmental management in Cambodia. Involved with decades of civil war, negligent and poor management of natural resources, lack of human resources, shortages of legislation and enforcement, and other negative activities lead the country to facing many environmental problems. These problems occur throughout Cambodia's territory such as deforestation, pollution, over exploitation of natural resources, flooding, land desertification, soil erosion and so on. Anyhow, this young ministry has been successful in the following:

### **2.3.1 Environmental policy and legislation**

The first environmental law in Cambodia is called the Law on Environmental Protection and Natural Resources Management and the National Assembly adopted it on 24 December 1996. This law contains 11 chapters and 27 articles. This law is a fundamental framework for other subsequent laws, sub-decrees, regulations, codes and standards for environmental protection and natural resources management. It does not intend to provide specific environmental management systems, codes and standards. It may leave these issues to other subsequent laws or regulations.

The main purposes of this law are concerned with natural resources management, the protection of environment from all kinds of pollution, and concentrate on the sustainable use of natural resources in order to promote socio-



**Figure 1: Organizational Structure of the Ministry of Environment, Kingdom of Cambodia**

Source: *Ministry of Environment, 1997*

economic development of the country. Furthermore, the law on environmental protection and natural resources management also mentions some points related to the marine environmental management including coastal resources management.

Based on the Law on Environmental Protection and Natural Resources Management the MOE introduced other environmental laws concerned with the environmental impact assessment and pollution control management. These environmental laws are as follows:

- Sub-decree on water pollution control, issued on 6 April 1999.
- Sub-decree on solid waste management, issued on 27 April 1999.
- Sub-decree on environmental impact assessment, issued on 11 August 1999.

### **2.3.2 Environmental education**

Environmental education (EE) is a fundamental issue for protecting and conserving the Cambodian environment, promoting socio-economic development, and to improving standard of living of people. EE will provide the necessary skill, knowledge and values, to the public, officials and decision-makers to be able to understand the complexities of the environment. The main objectives of environmental education are providing environmental awareness and skills to the public and to the officials in order to protect and conserve the environment and use its natural resources in a sustainable way.

In cooperation with and with support from UNDP, the Ministry of Environment prepared framework (outline) for integrating environmental education into all levels of Cambodian societies, since late 1993. This framework contains the most important issues including natural resources management, wildlife protection management, biodiversity conservation, pollution prevention management, the sustainable use of natural resources, public health, and other subjects related to the environment.

The policies and strategies of environmental education are using all methods of educational systems within Cambodia such as formal and non-formal schooling education systems, Buddhist education system, mass media, and professional and occupational training systems. These elements have to take responsibility for delivering EE as a legitimate aspect of its activities and accept it as fundamental to accomplish the objective of achieving a better environment. The target audience falls into three main groups: students including Buddhist monk students, officials and decision-makers, and the public people.

### **2.3.3 Nature conservation and protection**

Cambodia has a 435-km long coastline with 55,600-sq. km exclusive economic zone and shares marine borders with Thailand and Vietnam. In the coastal zone there are lots of forests particularly mangrove, numerous bays, and beaches. Cambodia also has several offshore islands; the biggest one is called Koh Kong. Cambodia's territorial sea and coastline are recognized as rich in biological productivity and supported habitats. These habitats include coral reefs, wetland areas and seagrass beds, adjacent along the coastlines. There are about 435 species of fish from 97 families and globally endangered marine mammals like dugong and marine dolphin (*Delphinus species*) (Tana, 1994) are living in these habitats. With this environmental value, Cambodia has created some marine national parks and wildlife sanctuaries, and multiple use management areas, some of which are located along the coastline (see Figure 2) as the following:

- National Park Kep covers an area of 5,000ha, and is located in the Kampot Province.
- National Park Ream covers an area of 150,000ha, and is located in Sihanoukville.
- National Park Botum Sakor covers an area of 171,250ha, and is located in the Kampot Province and Sihanoukville.
- Dong Peng (multiple use management area) covers an area of 27,700ha, and is located in the Koh Kong Province.
- Peam Krasop wildlife sanctuary covers an area of 23,750ha, and is located in the Koh Kong Province. (Royal decree on creation and designation of protected area, signed on 1 November 1993.)

The management of these protected areas is under the responsibility of the Department of Nature Conservation and Protection (DNCP).



### ***2.3.3.1 Mangrove forestry management***

Cambodian wetlands are an important habitat and they are dominated by mangrove forestry. This mangrove consists of 74 species and they are relatively pristine forests growing in four major species zones from the shoreline to the landward edge.

The total area of mangrove forestry in Cambodia is 85,100 ha, of which 63,200 ha grows in the Koh Kong province, 13,200 in Sihanoukville, 7,300 ha in Kampot, and 1,400 ha in Kep Municipality (Forestry Department, personal communication, and Mekong Remote Sensing Landsat, 1992). Abundant mangrove forest areas are located in the large estuary of Peam Krasob/Koh Sralao in the Koh Kong province. These areas are also reputed to be some of the best pristine mangrove forest lefts in the region. Many other estuaries are also growing mangrove, on a small scale, such as at Koh Por, Koh Yor, Dong Tong, Andoung Tuk, and Sre Ambel.

Cambodia does not have enough legislation on marine resources management, so the enforcement activities are not effective. Furthermore, due to the government's lack of resources, including financial, material and human, the enforcement operations done by the officials very rarely take place. These led the wrongdoers without being punished to continue to destroy the mangroves.

### ***2.3.3.2 Coral reefs management***

Coral reefs are another relatively important habitat for fish and other marine aquatic organisms. They exist along and around the coastline of the mainland and islands. There are 24 species of hard coral, 14 of soft coral and sea fans. Some coral reefs are in poor condition, probably because of sedimentation, particularly around Polowii Island (Koh Wai). Abundant coral reefs can be found around Koh Karang located in the Kampot province but very rare at Koh Daung. Most of the Cambodian islands are reported to be abundant in coral reefs. However, detailed information of its species and quantities do not exist yet. The government of Cambodia as well as MOE and MAFF pay less attention to the researching program on those reefs.

### **2.3.3.3 Aquaculture**

Since 1993, Cambodia is interested in creating aquaculture along the coastline particularly shrimp culture. Other cultures including oyster, green mussel and other marine fishes are not of significant interest for both production and economy, but shrimp is. Shrimp yield productions are reported to be high up to 7-8 tons per ha for the new starting farms and the profits are relatively attractive for further investment. Most shrimp farms are located in the Koh Kong province.

However, the shrimp industry has created serious negative side effects including shrimp diseases and self-pollution of cultural areas. Furthermore, it mostly generates toxic wastes and effluents discharged into the adjacent areas and the sea, which causes an impact on other economic activities and marine aquatic organisms including flora and fauna.

Nevertheless, the shrimp industry is not under responsibility of the Ministry of Environment. In Cambodia, all aquaculture and agriculture activities are under the control of the MAFF. These cultures create institutional conflicts, mostly related to the discharging of waste from farms, between the MOE and MAFF. The MAFF is looking for economic advantages only, while the MOE is worried about all kinds of pollution generated from farms including disease distribution. Unfortunately, the MOE has not been completely successful in discharge banning.

### **2.3.4 Pollution control management**

At present, Cambodia is facing to some kind of pollution related to soil, water and air. This pollution affects public health, sanitary and beauty of the State. The most serious pollutants are solid waste and sewage, but other types such as air and noise pollution are relatively small. All these kinds of pollution can be found within crowded communities particularly in the capital city, Phnom Penh and other large cities including Sihanoukville and Siem Reap town. Major pollution that occurs within these cities are solid waste (garbage), sewage and air pollutant substances (particle), which are generated from households, hospitals, factories, vehicles, and construction.

#### **2.3.4.1 *Solid waste***

Solid waste is a one of the major environmental pollutants of concern. Solid waste in Cambodia is dominant only in the cities and its quantity was about 464 tons per day in 1996 in the capital city and about 43 tons per day in Sihanoukville, which is located along the coastline. Based on a waste survey in 1992 by MOE officers, the components of solid waste were mostly organic matters generated from residential, commercial (markets) and industrials sources and the rest were generated from garment factories and medical facilities (from hospitals). The percentage of organic matters found in solid waste was high, nearly 90% of the waste mass in Phnom Penh. The vast number of this waste was deposited in open landfills not so far away from the city or dumped into drainage canal, waterways, lakes and swamps.

#### **2.3.4.2 *Sewage or wastewater***

Another environmental pollutant is wastewater or sewage and this normally takes place within urban areas and cities. In Cambodia wastewater is directly discharged into natural lakes (local name Boeng) or waterways, including streams and rivers. Phnom Penh and Sihanoukville municipal wastewater is discharged into lakes and rivers directly through sewage/drainage systems (pipelines).

Since the MOE does not have codes and/or standards on waste disposal, thus the industrial firms ignore the pollution and discharge their wastes directly into natural reservoirs or waterways. For example, a Brewery Company located in Sihanoukville has been discharging its waste directly into the sea through natural canals. This waste generates unpleasant smell and pollutes the environment along the way of disposed matter such as soil, water, air, fauna and flora.

The management of wastewater in Cambodia is not very effective, which is connected to three main factors. The first factor is related to poor/very old sewage systems and the pumping stations do not operate properly due to the lack of spare parts, aged equipment, and unreliable supply of power/electricity. The second factor is lack of cooperation from the public including their bad attitude, which is disposing garbage (from household) directly into sewage systems. The final factor came from

the increase in disposed wastewater because of the growing industries and residential areas, but the sewage systems still remain the same as before, and thus do not respond to the current demands.

#### **2.3.4.3 Air pollution**

Air pollution in Cambodia began to cause problems because many industrial firms, vehicles (cars and motorcycles) and other machines release emission into the air. Most factories are using their own generators as a source of power. Unfortunately, there is no available data related to air pollution. Nevertheless, knowing that the black smoke (emission) are generated from vehicles, generators (using for residential, hostels, discotheques, restaurants, and industries), and power plant stations.

Other categories related to air pollutants are dust/particles, and unpleasant smell. Yet, there is also no available data (both quantity and its impact) in these categories that have been notified by the public and officials. The MOE is trying to identify the sources of air pollution and prepare codes and standards for preventing and responding to such pollution.

### **2.4 Other institutions involved in environmental management**

It is interesting to note that the Ministry of Environment is a relatively new ministry. Therefore, most of the environmental management work involved overlaps some ministries and governmental institutions. These ministries are the Ministry of Industry Mines and Energy (MIME), Ministry of Agriculture, Fisheries and Forestry (MAFF), Ministry of Public Work and Transport (MPWT), and town/city Municipality.

#### **2.4.1 Ministry of Industry, Mines and Energy**

The overlapping work between MOE and MIME is related to the natural resources exploitation and industrial wastes. MIME is just focusing on the final productions from factories and mining. The rest (wastes) are normally disposed

away nearby land mine exploitation or discharged into the waterways. For example, Angkor Beer Brewery Company has discharged their wastewater directly into the sea through pipelines without considering the environment. MIME has the right to control all industrial firms in terms of their business and the quality of production. MIME does not take care of any waste generated from these firms.

#### **2.4.2 Ministry of Agriculture, Fisheries and Forestry**

Other pieces of overlapping work are related to fisheries and forestry management (exploitation and conservation). MAFF is responsible for fishing (fresh water and salt-water fishing) and forestry hunting. MAFF also manages all fishing lots throughout the country and provides private sectors to do so (by investment). MAFF just collect fishing fees including taxes from these sectors. In this case, the private sectors try to catch the fish as much as they can because it is their profits. MAFF is willing to get more revenues from that fishing too. According to the Department of Fisheries, the numbers of fish catching are increasing every year (see Tables 1 and 2).

**Table 1: Statistic of fish catch in metric ton.**

<b>Year</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
Marine catch	30,000	30,500	20,600	29,800	32,200	38,000
Marine culture	8,200	9,510	-	11,800	14,100	14,450
Total catch (tons)	38,200	40,010	-	41,600	46,300	52,450

**Sources:** *Fisheries Department: Annual report 1994, 1995, 1996, 1997, and 1998.*

*Royal Cambodia Embassy: Government report 1999, No.02 RB.K*

#### **2.4.3 Ministry of Public Works and Transport**

In addition to being responsible for all kinds of transportation and its infrastructures, the MPWT has another responsibility, which is taking care of garbage collection, transportation and disposal. This ministry has to provide staff and materials including trucks for transporting garbage. Cambodia does not have

garbage-separating systems yet. Therefore, all kinds of solid wastes (plastic, glass, composed matters, paper, construction waste, and others) are put into one garbage bin, and dumped into one-land fields.

Even now, garbage collection and transportation for disposal is currently done by MPWT. Like the MOE, MPWT has its own subordinates located in each province. The system of garbage collection and transport for disposal in each province is also done by the local (provincial level) MPWT.

Since Cambodia started to operate the opened sky strategy, the economy of the country is rapidly growing. This economic growth lead to problems for garbage disposal because of the public demands such as construction materials, vehicles (including second hand vehicles in high volume), household materials, and lifestyle materials. These kinds of demands generate high garbage in solid forms because the imported materials are mostly second hand products. These second hand materials do not provide high quality in use and nearly half of them (vehicles and clothes) need to be scrapped. Therefore, these second hand materials become garbage easily and cause considerable problems to be solved.

#### **2.4.4 Municipality**

Municipality is another governmental institution, which is involved with urban environment; it particularly deals with waste disposal. With cooperation between MPWT, the municipalities for both the capital (town) and provinces is responsible for garbage collection and keeping the city clean. The Municipality has to arrange places for garbage disposal and provide necessary garbage bins to be installed in those places.

### **2.5 Other considerations**

The environmental issues in Cambodia have become more crucial since 1993 when the new government was established. The opening sky strategy attracts foreigner investors to run their businesses in Cambodia, mostly light industries, such as wood and non-wood production, agriculture investment, communication facilities,

transportation, and other fields. These investments have caused the Cambodian environment to face numerous problems such as deforestation, over fishing, water pollution, waste disposal, over exploitation of natural resources and so on.

The marine environment has also become a major problem to be considered. The main environmental problems occurring along the Cambodian coastline are mangrove destruction, over fishing and illegal fishing activities, coral reef exploitation, pollution from land based sources, and other serious issues. Coastal development projects will also affect the marine environment, including tourism investment, port and waterways development, industrial and residential installations, and other activities. The following chapter will introduce the risks to the marine environment, which will happen in the near future during coastal zone developments.

## **Chapter 3**

### **Analyses of Current Marine Environmental Problems**

Activities in the Cambodian coastal zone have become more intensive since 1993. Since then the impact on the environment has been noticeable. Currently, the marine environment in Cambodia is facing many problems caused by economic reasons, the development of coastal areas, as well as involvement with other factors mentioned in the following points.

#### **3.1 Problems due to economic factors**

Since 1993, the growth of the economy has been booming dramatically. With this economic growth, many activities in the coastal zones, including mariculture activities, charcoal production, illegal fishing and poverty are influencing the marine environmental management. These activities are currently having a negative impact on the environment on a small scale and will be a serious risk in the near future, if a marine management system is not introduced.

##### **3.1.1 Mariculture**

Most mariculture farms are located in the Koh Kong province, where people enjoy shrimp farming by clearing the mangrove forest. The number of shrimp farms within this province is about 2.7% of the total mangrove forests in the Koh Kong, and they are increasing about 1.9% every year (DNCP/MOE, 1995).

Shrimp farming generates risks to the marine environment, including mangrove destruction, marine water pollution, and disease distribution caused by discharging wastewater from the farms.

At least 400 ha of mangrove forest were destroyed when making shrimp farms. As a result, not only the mangrove population was affected but also other species and their biodiversity habitats within the surrounding environment. Without mangrove, soil erosion processes will be introduced and may continue the following year.

Discharging wastewater from the farms directly into the seawater causes damage to the marine environment. This wastewater contains chemical substances and enzymes, used to increase shrimp productivity (in the farms only), on one hand, in the short-term period. On the other hand, these chemical substances and enzymes are harmful to the marine environment and life.

Firstly, the seawater had been polluted. Most of the small organisms were killed and some even stopped growing. Secondly, this discharging water contained some elements producing diseases including parasites, which harmed the marine fauna particularly, affecting mollusk species. Finally, this wastewater had an impact on the food chain/web within the discharging areas by killing lots of photo-plankton and zooplankton. Furthermore, these chemical substances and enzymes may affect the mortality rate of some species.

It is considered that the potential of the multiple use of natural resources has become worse due to the converting of mangrove forests into mariculture. Intensive shrimp farms can run only in a short-term period and be privately owned, but in the long-term run, they will impact on public interest, particularly affecting to people who live in the coastal areas.

### **3.1.2 Charcoal production**

It is noticeable that charcoal production has also affected the coastal environment. So far, people have produced charcoal from mangrove trees for domestic use. Nowadays, the movement of charcoal production has been changed

from domestic use to commercial purposes (for export). For example, in 1992, Taiwan had a contract with the government to export 10,000 tons of charcoal (DNCP/MOE, 1995).

There is no official data on how many mangroves had been cut down for charcoal production. However, the number of charcoal kilns has been recorded to more than 200 in 1993 and almost 1,000 kilns in 1994 (DNCP/MOE, 1995). The capacity of charcoal production is about 60kg per charcoal kiln with a diameter of 5m (average size). Each charcoal kiln can produce charcoal up to 10 times per year. This means that the quantity of charcoal production has been increasing dramatically every year.

Therefore, it can be imagined that, huge areas of mangrove have been destroyed for charcoal production. Large-scale mangrove cutting may cause habitat destruction, loss of biodiversity (species), sedimentation, soil erosion, and land marginalization (shortage of fertilizers and dryness).

### **3.1.3 Illegal fishing**

Another factor that generates risks to the marine environment is illegal exploitation activities of marine resources. These activities are mostly done by fishermen, who are using unauthorized materials and equipment for fishing including dynamite, poisonous substances, electricity, and unauthorized fishing nets.

Using dynamite for fishing may kill not only fishes but also destroys the marine environment and life. The explosive power causes short-term effects on the other fishes that live nearby the explosion zone. However, it destroyed fish habitats and exiled those fishes to live in other areas. Furthermore, dynamite explosion may cause serious damage to coral reefs. The coral reef that has grown for thousands of years will immediately be destroyed and will not grow (or take very long time to do so).

The purpose of using poisonous substances by fishermen is to catch big crabs. However, this does not only affect big crabs but also kill young crabs and other marine fauna. These poisonous substances also pose dangers to marine life

particularly killing zooplankton and other food web. This poison will further affect the mortality rate of new marine fauna.

Electricity devices are very rarely used for fishing at sea. Fishermen use these devices to catch fish in shallow waters particularly in nesting and feeding grounds. The impact of electricity is very high because it makes live fishes escape from their habitats (nesting and/or feeding grounds) and never return to the old places.

Unauthorized nets are also harmful to the marine fauna because they destroy marine life habitats. For example, using trawl nets will damage coral reefs, seaweed and/or seagrass where the habitats, feeding and nesting ground of fishes and other marine fauna are found.

Over fishing is another impact factor, which causes degradation of marine resources (fishes). Based on a USSR/Cambodia study between 1983-1986, it was reported that the amount of fish catch for sustainable use was about 20,000 tons of fish per year (MOE/NEAP, 1998). However, the amount of fish catch increased rapidly from 1,200 tons in 1980 to the pick 39,900 tons in 1990. Then the amount of fish catch declined dramatically to 20,600 tons in 1996 (see Table 2).

**Table 2: Annual marine fishery catches, 1980 to 1999**

<b>Year</b>	<b>Total catch (tons)</b>	<b>Year</b>	<b>Total catch (tons)</b>	<b>Year</b>	<b>Total catch (tons)</b>
<b>1980</b>	1,200	<b>1987</b>	17,417	<b>1994</b>	30,00
<b>1981</b>	814	<b>1988</b>	21,000	<b>1995</b>	30,500
<b>1982</b>	3,015	<b>1989</b>	26,050	<b>1996</b>	20,600
<b>1983</b>	9,444	<b>1990</b>	39,900	<b>1997</b>	29,800
<b>1984</b>	7,721	<b>1991</b>	36,400	<b>1998</b>	32,200
<b>1985</b>	11,178	<b>1992</b>	33,700	<b>1999</b>	38,000
<b>1986</b>	7,247	<b>1993</b>	31,100		

**Sources:** Fisheries Department, Annual report: 1994, 1995, 1996, 1997, and 1998.

MOE, 1998: National environmental action plan 1998-2000.

Royal Cambodia Embassy: Government report 1999, No.02 RB.K

The number of these catches does not include illegal fishing by local fishermen and fishing invasions by foreign fleets (neighboring countries).

Therefore, if the governmental authority does not consider this matter and take the necessary implication on those illegal activities, the number of marine fish stock in Cambodia will dramatically decline in the near future.

### **3.1.4 Poverty**

Another factor that is a dominant marine environmental threat is poverty. Cambodia is a very poor country, as about 39% of the population are living under the poverty line. The amount of poverty is relatively high in rural areas (about 40.1% poor), while the other urban areas also high (about 37% poor) but quite a bit lower in the capital (about 11.1% poor) (Ministry of Planning, 1997 and Government report 1999, No.02 RB.K).

People in remote areas are living in poor conditions. They are living based on self-employment by exploiting natural resources and doing agriculture. Since the agriculture production yields along the coastline are not sufficient, then these people try to hunt the natural resources such as cutting mangrove and doing illegal fishing as mentioned above. The poor people occupy huge areas of mangrove, so they start to cut these trees down to run their businesses for survival. Moreover, when the mangroves were cleared, they sell this area to the farmers/businessmen who do mariculture, particularly shrimp farms.

### **3.2 Problems from port and offshore developments**

Cambodia has raised many development projects, which are the key point for building up the country. A vast number of projects have been considered including marine and coastal zone development. The biggest project on marine and coastal zone development is port rehabilitation, oil and gas exploration and exploitation, and recreational installation. These three issues are the hot points to be considered in their current impact on the environment and as well as in the near future. The current impact on the marine environment can be considered as the following:

### **3.2.1 Pollution from port rehabilitation**

The project on Sihanoukville seaport rehabilitation was considered and approved by the government in late 1998. This proposal is requested to construct port facilities including a container cargo berth and its handling equipment installation. To be constructed this container port, about 1,312,000 m<sup>3</sup> of soil will be removed from the berthing place and another 465,000 m<sup>3</sup> will be removed from the canal (water way) (MPWT/Port of Sihanoukville report, 1999). This activity is expected to finish by the year 2003.

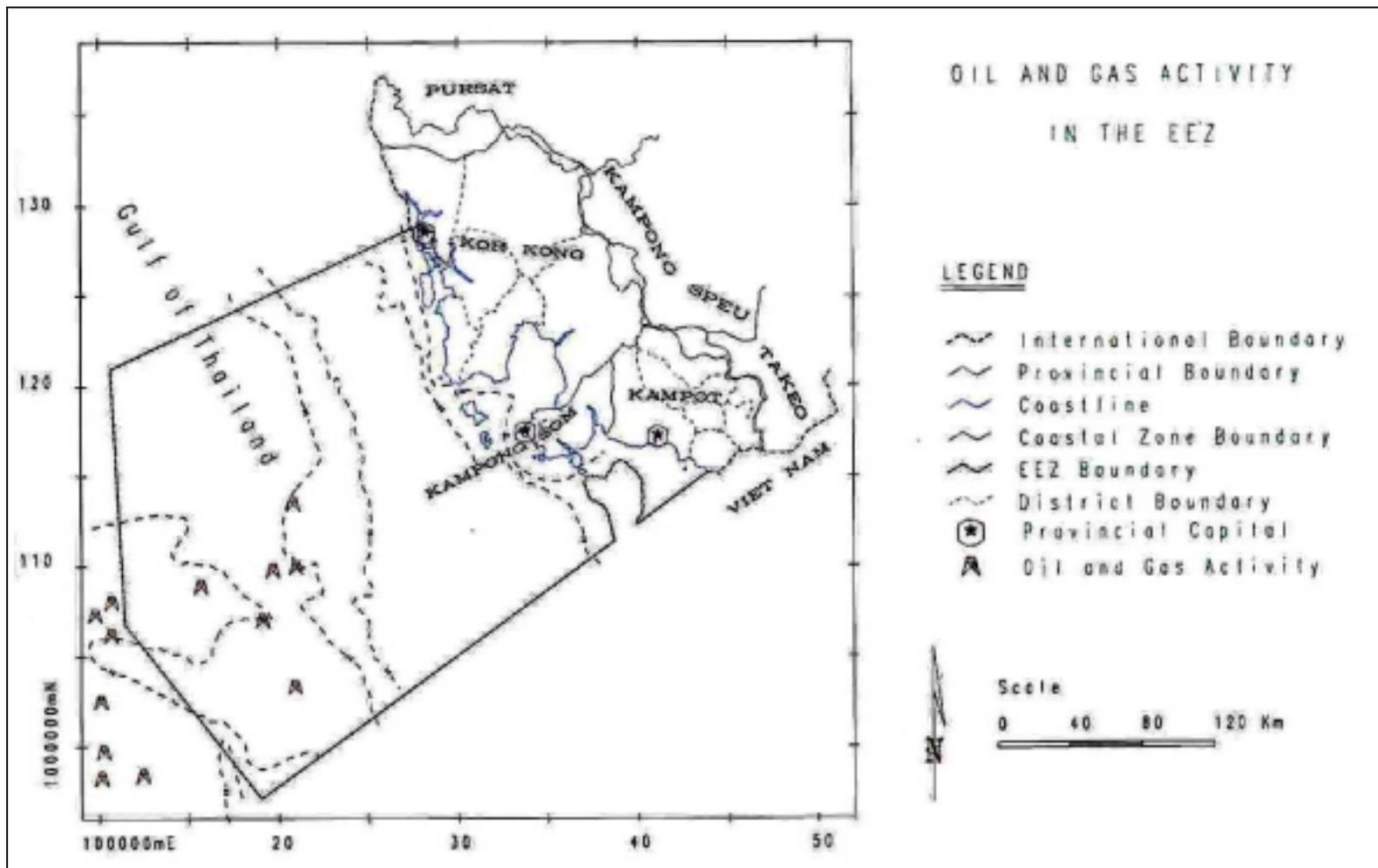
There are two main problems to consider when removing this soil from the sea. Firstly, there are particles that may generate from the removing these huge soils. If there are lots of particles and debris generated and suspended in the water, the current will transfer them to other places. In this case, these particles will pollute the seawater and may affect some places including fishing grounds, sensitive areas and recreational beaches, which are needed to be protected from any kind of pollution. Secondly, proper dumping places are required for disposal the removing soil. Otherwise, it may pollute the subsoil in the ground and underground water.

The risks to the environment (including marine environment) are impossible to prescribe unless an environmental impact assessment has been made. However, the impact from removing this soil is not a permanent or long-term effect to the environment.

### **3.2.2 Pollution from offshore development**

Oil and gas exploration within the Gulf of Thailand is becoming a potential. There are about 10 exploration blocks, which are located in Cambodian waters, some of which have drilled, tested and confirmed that there is abundant oil for exploitation (see Figure 3).

The installations of platforms and oil exploitation have not taken place yet. Nevertheless, some impacts on the environment have been considered and can be classified into five main categories.



**Figure 3: Oil and Gas Activity in the EEZ, Cambodia**

Source: *Ministry of Environment, GIS Office, 1998.*

### ***3.2.2.1 Physical presence***

The exploration process did not affect the marine environment in terms of installations of drill ship operating and support vessels moving around. However, the presence of drill ships and their supporting vessels affected fishing activities and other ships within the area of exploration.

### ***3.2.2.2 Operational discharge effect***

Normal operational discharge that may affect the environment can be caused by disposal of solid and liquid waste. This disposal resulted from drilling operation stages. The expected appropriate measurements to prevent further pollution are as follow:

- Solid waste materials would be high, serious and long-term affecting the marine environment, if disposed at sea. The wastes that were generated from the rig had been collected and segregated according to their natural physical and chemical characteristics, known as metal, waste oil and chemical materials. All these wastes must be back-loaded to shore to be reused and/or recycled. Other remaining materials that can not be reused and/or recycled must be dumped on shore and/or incinerated properly.
- The liquid waste that may be generated from the rig is sewage and drainage, and residual mud and cutting rocks. The sewage and drainage wastewater is normally low in volume. They may rapidly dilute in the seawater column and may slightly affect the marine environment. Cutting rock and its residual mud formed into muddy solution or water based mud, is composed of natural elements including clay, salt, mud, and rock. This water-based mud has normally low toxicity and very limited effects on the marine environment. Based on the Oil Enterprise Ltd's study (Brunchard, 1995), the effect of water based mud and cutting discharges into seawater may reduce species diversity and its richness. However, the seabeds itself can generally recovery within 6 months or so of cessation of the drilling stage.

### **3.2.2.3 *Accidental loss***

Some risks may happen when transferring materials between the rig and supplying vessels. The accidental loss of materials overboard may cause damage to the fishing equipment and/or disturbing fishing activities. Moreover, other accidental losses including chemical substances and toxic materials would bring risks to the marine environment.

### **3.2.2.4 *Accidental spill***

Many experiences of oil exploration related to the drilling process have confirmed that some accidental spills might happen. The spill may be generated during fuel transfers, well testing or leakage from the well during drilling. If the spill happens, it may spread rapidly due to the current and wind forces. Then the spill may disperse and degrade naturally under its characteristics including type of oil, and other conditions such as wave energy and water temperature. Consequently, the spill may cause damage to the marine environment and its scope of affecting the environment is related to the quantity of oil and weather conditions.

## **3.3 Other problems influence marine environmental management**

### **3.3.1 Human resources**

The risks to the marine environment can be caused by human resources, depending on the capacity building of the governmental officers and public awareness. Good understanding of the value of the environment may encourage people to participate in the management of the environment including the protection, prevention, and sustaining the quality of the environment. Poor understanding of environmental issues may bring harm to the environment starting from innocent activities.

### ***3.3.1.1 Official capacity building***

The environmental capacity building of governmental officers is very limited. That is why the management of the environment has not done well so far. Some problems were generated such as:

- The cause of the risk to the environment can not be identified and the scope of its risks and impact can not be evaluated.
- The officials were unable to perform their duties properly and efficiently.
- Some corruption during inspection may happen when the cause of pollution or destruction to environment is small in scale.
- The environmental laws are not strictly implemented and enforced.
- The polluters do not pay any attention to the environmental quality and furthermore do not want to cooperate with officials preventing and combating pollution.

These negative points affected the management of the marine environment. Some bad activities that may be a risk to the marine environment still exist due to the incapability of the officials, who are unable to perform their duties on environmental management.

### ***3.3.1.2 Public awareness***

Cambodian people lack environmental awareness, therefore, causing some threats to the marine environment. Firstly, their daily activities have made some risks to the marine environment including throwing garbage, doing illegal fishing, logging mangrove, and discharging wastewater from mariculture farms. Secondly, misunderstandings of the value of the environment lead them to pay less attention to protecting the marine environment. Finally, they do not want to cooperate and/or participate with MOE and other institutions in the prevention and management of the environment.

It should be understood that, the environmental management is not only the role of the MOE or government but also the obligation of the people. Conserving the environment, including the marine environment, means taking care of our lives.

### **3.3.2 Problems in implementing environmental legislation**

Other problems of marine environmental management are related to the implementation of environmental legislation and interference from other countries. These two points have created a great impact on the marine environment such as difficulty in implementing and enforcing environmental laws, harmonizing work with other governmental institutions, and deliberation of dumping waste in Cambodia by other countries. For example, Taiwan shipped and dumped chemical wastes (3,000 tons of mercury waste) in December 1998 and the Republic of Korea (South Korea) shipped and dumped 650 tons of plastic waste in Sihanoukville. With local and international pressures, the Royal Government of Cambodia completely sorted out of these chemical wastes and ordered to ship back from Cambodia on April 2, 1999. Regarding to 650 tons of plastic waste, the government ordered for shipment to the Korea in September 1999 (Government report 1999).

#### ***3.3.2.1 Inadequate legislation***

There are some problems related to overlaps in jurisdiction and function between governmental institutions. Many laws and decrees prescribe the right of each ministry but do not mention the coherent framework for inter-ministerial cooperation. When the new framework law on Environmental Protection and Natural Resource Management was introduced in 1996, the overlapping jurisdictions had been recognized. Most of them are related to the revenue collection by each ministry and redundant work in the administrative management systems.

Inadequate guidelines for inter-ministerial cooperation were caused by overlapping work between MOE and other governmental institutions (see Table 3). The following fields are the major constrains on administrative and technical works.

**Table 3: Overlap working areas between governmental institutions**

<b>Institutions</b>	<b>Overlapping works</b>
1. MOE and MAFF	Forestry management: forestry conservation and exploitation.
2. MOE and MAFF	Fishery management: Fisheries conservation and exploitation.
3. MOE and Municipality and MPWT	Garbage management: Garbage collection, transportation and dumping
4. MOE and Municipality	Sewage management (not include industrial waste): Drainage system
5. MOE and MIME	Wastewater from industries: Drainage system, and wastewater treatment management

Nowadays, these overlapping problems have not yet been solved and they have lead to lack of harmonic cooperation between each ministry in regarding environmental management matters.

### ***3.3.2.2 Institutional problems***

As result of power sharing arrangements within the government between various political parties caused the ministries to rule by different officials nominated from their parities.

Some of them are not harmony with each other and this causes problems of lack of cooperation among the governmental agencies. Furthermore, it caused political instability and priority of internal security. In other words, the attention to environmental management is very low or little. This problem may be more essential in the provinces, some of which are in remote areas and inaccessible from the capital. The provincial authorities still maintain control over local activities and just follow administrative guidelines from the central one.

Therefore, the Ministry of Environment is facing many problems regarding inadequate environmental infrastructure including shortage of manpower, financial resources and experiences.

### **3.4 Expected on future problems**

The above discussions are about the current environmental problems that came across several fields and factors. Most problems on marine environmental management came from human activities on land and their negligence on the value of the environment. There are some serious problems, which could affect the marine environment in the near future, as soon as the development project is completed. These problems are related to pollution from land based sources, sea born and maritime activities which may affect the marine environment.

#### **3.4.1 Pollution from land based**

##### ***3.4.1.1 Waste from residential areas***

The government was concerned with rebuilding the economy after a few decades of the civil war was finished and thus decided to use Sihanoukville as an economic and industrial zone for development, as a priority. This project has encouraged people to settle their residence and business there. Increasing the population will increase the consumption of goods, which in turn influences wastes disposal matters. Garbage and sewage are the major problems of waste disposal which have to be taken care of immediately from now on. Poor management and/or concerning that matter will cause of marine environmental destruction by pollution.

##### ***3.4.1.2 Waste from industries***

In late 1998, the government signed a memorandum on free trade zone investment in Sihanoukville. This memorandum concerns port rehabilitation, and other industrial developing fields including zones for wood production and processing sectors, electronic sectors, food and non food production sectors, light industries sectors, and marine production processing sector.

The concerns on wastewater treatment have not been taken into account yet for these industries. Therefore, wastewater released from those industries may directly be discharged into the sea. If it so, there would be damage to the marine environment including fauna, flora and the quality of seawater and beaches.

#### ***3.4.1.3 Waste from recreational areas***

The number of tourists who visit Cambodia is rapidly growing, increased 20% in 1999 (Government report, 1999), compared to last year, 1998. Places attracting tourists to visit are ancient temples and coastal beaches. The fast growing tourist rate attracted investors to improve recreational facilities, including hotels, transportation, food, souvenir items, and others. Lots of hotel projects (big and small in total 179 hotels) are being under consideration, many of which will be located in Sihanoukville, which is known for its beautiful beaches.

Tourists always leave behind environmental problems such as garbage, sewage and disease distribution, if the necessary measurement does not apply. Poor consideration of environmental management would cause risks to the marine environment in terms of pollution.

### **3.4.2 Pollution from marine activities**

#### ***3.4.2.1 Pollution from maritime transport***

The number of ships calling at Sihanoukville Port is increasing ever year. In the 1980s, there were less than 100 ships calling alone at Cambodia seaport. However, this number was dramatically increased about five times during the 1990s (see Table 4). This means that, many goods (not including oil) have been transported through Sihanoukville Port (import and export cargoes).

The number of ships (shown in Table 4) calling to the Cambodia seaport (or Sihanoukville port) did not include oil tankers. According to the statistic made by MPWT, about 635,000 tons of oil was imported in 1995 and may increase to 1,384,000 tons in the year 2000, and 2,018,000 tons in the year 2005 (MPWT's report, 1999).

**Table 4: Number of ships calling to Sihanoukville port and import and export commodities**

Description	Unit	1991	1992	1993	1994	1995	1996	1997	1998
No. of ships	Ship	144	226	337	411	615	686	785	648
Total cargoes	Tons	132,550	283,992	474,387	547,313	707,705	741,002	794,276	864,191
Import cargoes	Tons	45,677	206,642	322,194	439,738	554,278	636,581	652,791	726,048
Export cargoes	Tons	86,873	77,350	152,193	107,575	153,427	104,421	141,485	138,143
Cargoes in containers									
Weight	Tons	-	30,671	125,697	138,997	228,636	309,991	355,697	398,244
In TEU	TEU	-	4,194	23,986	21,186	38,942	55,734	60,990	69,237

**Source:** *Report on Sihanoukville port's activity, MPWT, 1999.*

It is interesting to note that the international community is concerned with new types of marine environmental pollution caused by ballast water discharged from ships. Ballast water is a global environmental problem that has happened around the world caused by transporting unwanted organisms and discharging at port. These organisms may cause damage or destroy local marine life (fauna and flora). Furthermore, this ballast water may pollute seawater at port if an alien vessel loads dirty water at departure point.

Other type of marine pollution that may have an impact on Cambodian waters is ship incidents. An accident may happen within Cambodian waters as well as in the Gulf of Thailand, where maritime traffic is busy (see Appendix 03). If so, the major pollutant is oil substance and its products caused by oil spill incident and normal operational discharge, and other harmful substances (chemical substances) released from ships. The spill greatly may affect marine life (fauna and flora) and its biodiversity and food chain. The most serious impact that may occur is if the spill is spreading and encroaching on the marine sensitive areas and marine parks (see Figure 2).

Another problem involved is maritime navigation. Sunken vessels, wrecks and/or abandoned ships are involved with this matter, for at least disturbing maritime transport and fishing activities.

#### ***3.4.2.2 Pollution from port activities***

Small-scale pollution can be found at port in terms of sewage, garbage, and oil spill, which are caused by normal operations from ships, port and accidents during loading and discharging goods. This pollution does not affect the local environment in the short run but it creates sanitation problems at port. Frequent carelessness of cleaning up operations will cause great pollution (water pollution) within the port area (harbor) and affect human health and marine fauna and flora.

#### ***3.4.2.3 Oil and gas exploitation***

When Cambodia is able to exploit its natural oil and gas, there will be lots of oil tankers calling the Cambodian seaport of Sihanoukville. In addition to loading oil and gas as their cargo, these ships will need to get some bunker and ballast water. Then, more or less, marine pollution will occur caused by normal operational discharges. However, the major marine pollution that may happen in the future is oil spill from those tankers and/or platforms.

A spill may come from tanker incidents, leakage and normal operational discharge from ships and platforms. This spill will cause damage to marine life particularly fish, fauna, and flora, and their habitats and food chain. Further damage from a spill will affect shorelines, where numerous mangroves and other wetland forests are growing. Oil would cause damage to the forest along the shoreline and destroy abundant biodiversity along the coast. Another impact by oil spill is blackening of the beaches, which are enjoyable places for local and international tourists.

Clean up operations are the major issues to be carefully considered. Bad management of these activities would have long term impact on the marine environment because oil would be attached to the soil and other materials. Under sunlight, oil may release its chemical substances and kill microorganism, which play a major role in generating fertilizer and composing dead organisms and biome.

In conclusion, the current marine environmental problems are generated from mariculture, port and offshore developments, lacks of human resources, inadequate

environmental legislation, and shortage of financial resources. The current marine environmental problems would cause damage to environment little by little but bring great suffering in the near future. However, the greatest impact on the marine environment is dumping or discharging wastes into the sea, oil spills from ships and platforms, and other chemical substances released from ships by accidental or operational discharges. This impact would kill numerous marine lives in a short period and may cause long-term impacts on marine organisms, their environments and food chain.

In order to prevent such pollution, necessary measures should be considered by Cambodian government institutions and agencies, including legal instruments and operational aspects. Such instrument will be discussed in Chapter IV, focussing mainly on international conventions.

## **Chapter 4**

### **Measures for the Protection of the Marine Environment from Pollution**

In order to protect marine environment in Cambodia from pollution caused by ships and marine activities, it is necessary to consider the necessary measures for preventing and responding to marine pollution, particularly legal aspects. There are several legal instruments established and implemented by the international community for managing the marine environment free from pollution. These legal instruments are MARPOL 73/78, London Dumping, BASEL, OPRC, Intervention, CLC 69, Fund and HNS Conventions, and UNCED-Agenda 21.

#### **4.1 MARPOL Convention**

The International Convention for the Prevention of Pollution from Ships was adopted by the IMO in 1973 and modified by the protocol of 1978. Nowadays, this Convention known as MARPOL 73/78, is one of the most important international agreements on the subject of marine pollution from ships.

##### **4.1.1 Purpose of the Convention**

The main purposes of this Convention is to deal with the needs to control and minimize the deliberate, negligent or accidental discharge/release of oil and other substances from ships into the marine environment.

#### **4.1.2 Description of the Convention**

The MARPOL 73/78 Convention provides detailed regulations covering various sources of ship generated pollution. It consists of six annexes, which are involved with the necessary measures to prevent pollution from ships by oil, noxious liquid substances, harmful substances, sewage, garbage, and air pollution emission.

Annex I deals with the prevention of pollution by oil from ships, particularly oil tankers. Controlling measures are specified on the amount of oil that can be discharged at sea and standards are established for segregated ballast tankers and onboard equipment such as crude oil washing devices, oily-water separator, pumping and discharge systems, and monitoring devices.

Annex II deals with the controlling of pollution by noxious liquid substances in bulk chemical carriers. Discharge criteria are established for different types of chemicals in different operating environments. Standards have been established for tank washing and associated pumping and piping arrangement.

Annex III deals with the prevention of pollution by harmful substances carried in packaged forms including freight containers and portable tanks. This annex provides guidelines for packaging, labeling, stowage and documentation of such substances.

Annex IV deals with the prevention of pollution by sewage from ships. It includes guidelines from the discharge of sewage into the sea within established criteria. This annex has not yet entered into force.

Annex V deals with the prevention of pollution by garbage from ships. Annex V requires the government to provide garbage reception facilities at port and terminals.

Annex VI deals with the prevention of air pollution by emission from ships. It was adopted in 1996 but has not yet entered into force. The aim of this annex is to reduce emissions of airborne pollution by ships. It includes a global concern on the sulphur content of bunker fuel, limits CFCs, SO<sub>x</sub>, and NO<sub>x</sub> emissions and relates to the incineration of certain products.

Each annex has mentioned clearly the necessary measures to control and prevent pollution from ships including survey and inspection, issuance of certificates, port state control operations, requirements for control of operational pollution, requirements for minimizing accidental pollution, shipboard contingency plans, and guidelines for discharging and disposing of waste.

This Convention was ratified by 106 contracting States representing 94% of the world's tonnage of shipping (IMO Report, 1998). However, parts of this Convention have entered into force on different dates since October 1983, beginning from annex I (1983), Annex II (1987), annex V (1988) and annex III (1992).

#### **4.1.3 Status of Cambodia to the Convention**

Cambodia ratified MARPOL 73/78 Convention on 28 November 1994 and most annexes (I-V), except annex VI. The provision of this Convention immediately entered into force in Cambodia on February 28, 1995, (IMO, 1998) shortly after it had been ratified.

The provisions of this Convention are being implemented in Cambodia by the port authorities (both river and sea port), under the responsibility of the Ministry of Public Work and Transport. Nowadays, after having established the Department of Merchant Shipping, this department has been responsible for the implementation of MARPOL 73/78 Convention.

There are some problems with the implementation of MARPOL 73/78 in Cambodia, arising from the lack of human resources, technical and financial matters, and also the lack of national legislation and regulations. Poor cooperation with national agencies may also cause obstacles to implement this Convention.

#### **4.2 LONDON Dumping Convention**

The Inter-Governmental Conference on the Convention on the Dumping of Wastes at Sea was held in London in 1972, and is known as the London Dumping Convention.

#### **4.2.1 Purpose of the Convention**

The main purpose of the London Dumping Convention is to prohibit any deliberate disposal at sea of wastes, materials and other substances of any kind. This convention does not include the disposal at sea of wastes or other matters incidental or derived from the normal operation of vessels, aircraft, platforms, or other manmade structures at sea and their equipment. (Article 3).

#### **4.2.2 Description of the Convention**

The London Dumping Convention indicates the necessary measures to prohibit any deliberate disposal at sea of wastes, materials, and substances of any kind, form or destruction from vessels. This Convention composed by three main sections—the London Dumping Convention (part A), origin, scope, provisions and implementation of the Convention (part B), and Annexes (part C).

Part A to this Convention describes the provisions of the convention mainly the role of contracting States on the implementing this convention and including the means of dumping wastes and other materials. There are three annexes attached within this part. Annex I mentions the category of wastes and regulations for the control of incineration of wastes and other matters at sea. Annex II deals with other wastes such as chemical organic and non-organic, containers, scraped metal, bulky wastes, and radioactive wastes, which are not mentioned in Annex I. Annex III mentions the characteristics and composition of the matters including toxicity, chemical and biological; the characteristics of dumping site and method of deposit; and general consideration and condition.

Part B mentions the origin, scope, provisions and implementation of the Convention. The main issues under part B describes the basic provisions of the Convention, means of implementation, the specific dumping requirements and assessments, and institutional arrangements. Other matters such as dumping and incineration vessels, disposal of offshore installations and structures, floating oily waste reception facilities, radioactive wastes, incineration at sea, dredged material, and transboundary movements are also mentioned in this part.

There are 33 annexes mentioned under part C to the Convention. These annexes describe the guidelines for the implementation of the convention, procedures and interpretation of the convention, report of the disposal of waste and other matters.

The London Dumping Convention has been ratified by 77 of the contracting States (IMO, 1998). The London Dumping Convention entered into force on August 30, 1975. The Convention remains open for interested States to ratify in the future.

#### **4.2.3 Status of Cambodia to the Convention**

Cambodia has not ratified this Convention but would consider ratifying it in the near future. Therefore, this Convention is not implemented in Cambodia jurisdiction.

### **4.3 UNCED (Agenda 21 on the protection of the oceans)**

The United Nations Convention on Environment and Development (UNCED or Agenda 21) is an international agreement, which deals with the international cooperation for the protection of global environmental and sustainable development issues. The Conference for this agreement was held in Rio de Janeiro in June 1992 and this agreement is known as UNCED or “Earth Summit 92” or called Agenda 21.

Agenda 21 covers very broad issues for the global conservation and management of resources for development, one of which deals with the protection of the oceans. This issue is mentioned in chapter 17 of the Agenda 21.

#### **4.3.1 Purpose of Chapter 17 “the protection of the oceans”**

The main purpose of chapter 17 (the protection of the oceans) deals with oceans management regimes “to pursue the protection and sustainable development of the marine and coastal environment and its resources”.

#### **4.3.2 Description of Chapter 17 “the protection of the oceans”**

Chapter 17 of this Agenda deals with the protection of oceans. The Coastal States were provided the right and obligation “to pursue the protection and sustainable development of the marine and coastal environment and its resources” (Article 17.1). With these approaches, the coastal States are obliged to consider the following program areas:

- Integrated management and sustainable development of coastal areas, including exclusive economic zones,
- Marine environmental protection,
- Sustainable use and conservation of marine living resources under national jurisdiction,
- Addressing critical uncertainties for the management of the marine environment and climate changes,
- Strengthening international, including regional, cooperation and coordination,
- Sustainable development of small islands.

Agenda 21 also provides comprehensive frameworks for the Coastal States to handle the above program areas. These frameworks cover several issues such as basis for action, the objectives of each program, activities, and means of implementation. UNCED Agenda 21 is reflected in the international maritime regimes, basically the United Nations Convention on the Law of the Sea (UNCLOS) the International Maritime Organization (IMO, primarily MARPOL 73/78) and other related bodies.

There are no requirements for its ratification and dateline for its entry into force. However, the Agenda 21 applies to all member States of the United Nations and should be implemented as soon as the Conference has finished. The United Nations Environmental Program (UNEP) will provide technical assistance and cooperation for the means of the protection of global environment and the sustainable development to the member States of the UN.

### **4.3.3 Status of Cambodia to Agenda 21**

Cambodia did not attend this Conference and did not sign the agreement of Agenda 21. However, Cambodia implemented this Agenda in 1993, shortly after the Ministry of Environment was established. Like other IMO Conventions, there are some difficulties in implementing this Agenda, which is related to the lack of human resources, legal instruments, financial, and material resources. Further problems have arisen from poverty, poor governmental administration systems, negligent environmental protection management, and other issues resulting from decades of civil war.

## **4.4 Basel Convention**

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) was adopted by the International Conference of the Plenipotentiaries on 22 March 1989.

### **4.4.1 Purpose of the Convention**

The main purpose of this Convention is to prohibit any means of transporting wastes from one country to another. Further, it intends to minimize and control international trade in transboundary waste movements.

### **4.4.2 Description of the Convention**

The Basel convention is a global instrument for minimizing and controlling international trade in transboundary waste. The term of waste was defined under Article 2 of this convention that “Wastes are substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provision of national law.” The Convention also mentions hazardous wastes, which belong to the categories listed in Annex I to the Convention or those that are considered as hazardous by the domestic legislation of either the Party of export, import or transit (Article 1.1).

The Convention provides a shared responsibility of exporting and importing States for environmentally sound management and disposal of such wastes. The term of “environmentally sound management” is defined under Article 2.8.

The Basel Convention outlines the general obligations for contracting States. It provides, inter alia, that Parties must not export wastes to another Party, which has declared a prohibition on the import of such waste (ARTICLE 4.1). The Convention also requires contracting States to take the appropriate measures to minimize the generation of hazardous and other wastes, and ensure that they have adequate disposal facilities for the environmentally sound management (Article 4.5).

If the wastes need to be transported, they must be packaged and labeled (Article 4.7). Furthermore, written notifications, documents and permission of wastes movement must be developed and distributed among export, import and transit States in accordance with Annex V(A) of the Convention before the movement of wastes take place (Articles 6.1, 6.2 & 6.4).

The Basel Convention entered into force on 5 May 1992. By July of 1999, 130 member States had ratified or accessed this Convention (UNEP web-site, 1999). The Convention remains open for interested States to ratify at the United Nations Headquarters in New York (Article 21).

#### **4.4.3 Status of Cambodia to the Convention**

Cambodia has not ratified the Basel Convention but would consider ratifying it in the near future. Therefore, this Convention has not been implemented in Cambodia yet.

#### **4.5 OPRC Convention**

The International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC Convention) was adopted by a diplomatic Conference convened by IMO in 1990.

#### **4.5.1 Purpose of the convention**

The main purpose of this Convention is to deal with preparing for and responding to oil pollution incidents, not only from ships but also from offshore oil exploration and production platforms, seaports and oil handling facilities, which are done by the contracting States.

#### **4.5.2 Description of the Convention**

The OPRC Convention is designed primarily to assist countries to prepare for and respond to major oil pollution incidents. This Convention is composed of various Articles, covering the appropriate measures to prepare for and respond to oil pollution incidents. These appropriate measures are included in the following aspects:

- Preparation of oil pollution emergency plans done by the operators;
- Oil pollution reporting procedures and the actions to be taken on receipt of such a report;
- Research and development, and technical cooperation;
- Establishment of national and regional systems for preparedness and response, and establishment of a global framework for international cooperation in pollution response.

In the event of an oil spill from a ship, the vessel concerned must report the incident to the relevant coastal authority and response action must be taken in accordance with the provisions of the OPRC Convention. Member States are to provide for stockpiles of oil spill combating equipment, and are to exercise their ability to respond to an oil spill. Member States are also to develop detailed plans for responding to oil pollution incidents. Parties are required to assist other Parties in their response to an oil pollution emergency, and the Convention provides a mechanism (guideline) for reimbursement of any costs spent by assistant Parties. The OPRC Convention recognizes an important coordinating role for the IMO.

Ratification or accession of this Convention has remained thereafter for any State interested to become party to the Convention. The OPRC Convention has been ratified by 89 States (IMO report, 1998) and entered into force in May 1995.

#### **4.5.3 Status of Cambodia to the Convention**

Pending on ratification, this Convention has not been implemented in Cambodia.

#### **4.6 INTERVENTION Convention**

The International Convention relating to Intervention on the High Seas in case of Oil Pollution Casualties (INTERVENTION Convention) was adopted by IMO on 29 November 1969.

##### **4.6.1 Purpose of the Convention**

The main purpose of Intervention Convention is:

- To provide powers to intervene on the high seas in respect of marine casualties resulting in or likely to result in major environmental damage;
- To protect the interest of people against the grave consequences of marine casualties resulting in danger of oil pollution of the sea and coastline;
- To recognize that measures of an exceptional character to protect such interests might be necessary on the high sea, provided these do not affect the principle of freedom of the high seas.

##### **4.6.2 Description of the Convention**

The Intervention Convention provides for contracting State to “take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interest from pollution or threat of pollution of the sea by oil” (Article 1). A State may intervene in the event of a collision of ships, a stranding, or any other navigational incident, which results in material damage, or the imminent threat of such damage to a ship or its cargo

(Article 2). Therefore, States are empowered to take action to prevent pollution damage to their interest against ships for which they are not the flag State while the ships are outside the jurisdiction of the coastal state on the high seas. Except in the case of extreme urgency, States are required to notify the ship-owner and other States that might be affected by any proposed action, and to establish liaison with IMO and other experts before taking action (Article 3). If a State takes action that exceeds that which was necessary, compensation may have to be paid (Article 6). Dispute over the jurisdiction for actions taken by a State and questions of compensation are to be resolved through conciliation or arbitration (Article 8 and Annex A).

A Protocol to the Intervention Convention in 1973 extended most of the provision of the Convention to cover substances other than oil (Article 2). Those substances are subjects that are listed in an annex to the Protocol and those other substances which are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea (Article 1).

#### **4.6.3 Status of Cambodia to the Convention**

Cambodia has not ratified this Convention but would consider ratifying it in the near future. Therefore, this convention has not been implemented in Cambodia.

### **4.7 CLC 69 Convention**

The International Convention on Civil Liability for Oil Pollution Damage was adopted by IMO on 29 November 1969. This Convention is known as CLC 69.

#### **4.7.1 Purpose of the Convention**

The main purpose of the International Convention on Civil Liability for Oil Pollution Damage (CLC 69) is:

- To provide adequate compensation to persons who suffer damage caused by pollution resulting from the escape or discharge of oil from ships;

- To provide strict but limited liability (liability even in the absent of fault) against the owners of a vessel for oil pollution damages and creates a system of compulsory liability insurance.

#### **4.7.2 Description of the Convention**

Major provisions of this Convention are subjected to the liability of ship-owner, limitation liability, insurance, and recovery operation compensation. Liability is restricted to damage caused by oil from a vessel “actually carrying oil in bulk as cargo”, or oil from loaded tanker. The Convention provides the definition of oil as “persistent hydrocarbon mineral oil such as crude oil, fuel oil, heavy diesel oil, and lubricating oil” (Article 1). The Convention also provides restricted claims for damages by the limitation that they relate only to damage or the expense of preventive measures from oil that has actually spilled from a vessel (Article 1[6]). The Convention further provides “exclusively to pollution damage caused on the territory including the territorial sea of a contracting State” (Article 2).

The ship-owner’s liability regime is laid down within Article 3 to the Convention. The amount of owner’s liability is limited in accordance with certain detailed rules (Article 5). Furthermore, the Convention prohibits claim against crew, charterer, salvage operator, or other people whose working on behalf of the owner (Article 3).

The Coastal State may get economic benefits from the insurance policy, which was attached to the ship-owner, whose ships are carrying over 2,000 tons of oil as cargo (Article 7). This means that, if the accident had happened, the ship-owner has available funds to compensate to that damage caused by oil pollution.

Damages caused by oil pollution incidents may take time to recover and a great deal money. The compensation for this recovery operation is the responsibility of the owner but in a limited period (Article 8). However, the CLC 69 Convention, does not cover compensation funds for any damage when the incident(s) occur within the exclusive economic zone (outside the territorial sea).

The CLC 69 Convention entered into force on 19 June 1975 and was ratified by 77 Contracting States (IMO, 1998).

#### **4.7.3 Status of Cambodia to the Convention**

Cambodia ratified CLC Convention on 28 November 1994 and it immediately entered into force in Cambodia on February 28, 1995, (IMO, 1998).

### **4.8 FUND Convention**

The International Convention on the establishment of an International Fund for Compensation for Oil Pollution damage known as the “FUND Convention” was established and adopted by IMO in 1992.

#### **4.8.1 Purpose of the Convention**

The main purpose of the FUND Convention is to provide supplement compensation to victims of oil pollution damage who can not get adequate compensation for the damage under the applicable civil Liability Convention.

#### **4.8.2 Description of the Convention**

In 1992, IMO made amendment to the protocols to the CLC Convention 69 and the Fund Convention 1971, and established and adopted the 1992 Fund Convention. The scope of the Fund Convention was widened by the 1992 protocol to cover oil pollution damage caused in the territory or territorial sea of a State which is party to the Convention and to pollution damage caused in the exclusive economic zone (EEZ), or equivalent area, of such State. The 1992 Fund Convention also increases the total amount of compensation available to victims of oil pollution damage.

Furthermore, only Party States to the CLC 1992 can become members of the International Oil Pollution Compensation Fund (known as IOPC Fund), which was set up under the 1992 Fund Convention. The main purpose of the IOPC Fund is to supplement the compensation amount paid for oil pollution damage under the CLC

1992 in cases where the amount paid under the CLC 1992 prove to be inadequate (Article 2 & 4). The IOPC Fund will not pay if the damages occur as a result of war, from a warship spill, or if the claimant cannot prove that one or more ships caused the damage (Article 4.2). Finance for the IOPC Fund came from a levy paid by the recipients of more than 150,000 tonnes per annum of crude oil and fuel oil in a Contracting State (Articles 1 & 10).

The Fund Convention 1992 had entered into force on 30 May 1996, and was then ratified by 23 States by June 1998 (Claims Manual 1998, IOPC Fund).

#### **4.8.3 Status of Cambodia to the Convention**

Cambodia has not ratified this Convention yet.

#### **4.9 HNS Convention**

The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS Convention) was adopted by IMO on 3 May 1996.

##### **4.9.1 Purpose of the convention**

Similar to the CLC, the main purposes of HNS Convention are:

- To create a regime of liability for both the ship and cargo owners to provide adequate compensation to victims in the event of pollution harm arising from the escape of hazardous or noxious substances carried by sea.
- To establish its own international fund from which victims may be able to supplement the amount they receive in damage.

##### **4.9.2 Description of the convention**

The HNS Convention deals with adequate compensation to victims suffered by pollution arising from the escape of hazardous or noxious substances (HNS) carried by sea. This Convention is applied to any damage caused in the territory of a State Party, which caused damage to the environment (Article 3). The Convention

also applies to claims, other than claims arising out of any contract for the carriage of goods and passengers, for damage arising from the carriage of hazardous and noxious substances by sea (Articles 4.1 & 4.2).

However, the Convention does not apply to pollution damage caused by oil spill incidents (under the CLC regime) and to damage caused by a radioactive material of class 7, either in the IMDG Code, or in appendix B of the code of Safe Practices for Solid Bulk Cargoes (Article 4.3).

Furthermore, the Convention provides regime of liability and limitation liability to the owner, which is similarly to the CLC 69 Convention's regime (Articles 4, 9, 10, and 11). Moreover, the Coastal State may get economic benefits from the insurance policy, which was attached to the ship-owner (Article 12).

The HNS Convention established a compensation regime called the International Hazardous and Noxious Substances Fund (HNS Fund). The main objective of this fund is to provide compensation for damage in the connection with the carriage of hazardous and noxious substances by sea (Articles 13 and 14).

This Convention has not yet entered into force because the ratification made by contracting States does not fulfill the requirement to the provision of the Convention. At present, there are 8 contracting States who have ratified the HNS Convention (IMO, 1998).

#### **4.9.3 Status of Cambodia to the Convention**

Cambodia has not ratified this Convention but would consider ratifying it in the near future. Therefore, this convention has not been implemented into the Cambodian jurisdiction.

In conclusion, the means of these conventions and agreements are to firstly try to prevent all kinds of marine pollution either from land based and sea born activities (MARPOL 73.78, London Dumping, Basel, and Agenda 21 Conventions). Secondly, in case of the pollution, there would be necessary measures to combat such

pollution (OPRC, and Intervention Conventions). Finally, the compensation regime would be applied to recover the original environment.

In 1994 Cambodia accessed some of the above conventions (see Table 5). However, the means of implementation of these agreements are not very effective due to the lack of human resources, technical and cooperation assistance, and inadequate national legislation including financial factors.

**Table 5: Summary of status of international agreements related to marine management.**

No	Conventions	International regime			National regime	
		Adoption	Entry into force	Ratified by	Accession	Entry into force
1	MARPOL 73/78	17 Feb 1978	2 Oct 1983	106 states	28 Nov 1994	28 Feb 1995
2	London Dumping	29 Dec 1972	30 Aug 1975	77 states	-	-
3	UNCED Agenda 21	Jun 1992	Since signed	N/A	-	Concerns by 1993
4	BASEL	22 Mar 1989	5 May 1992	130 states	-	-
5	OPRC	30 Nov 1990	13 May 1995	40 states	-	-
6	Intervention	2 Nov 1973	30 Mar 1983	41 states	-	-
7	CLC 69	29 Nov 1969	19 Jun 1975	77 states	28 Nov 1994	28 Feb 1995
8	Fund 92	1992	30 May 1996	31 states	-	-
9	HNS 96	3 May 1996	Not yet	8 states	-	-

**Sources:** *IMO documents, J/7031, 1998; BASEL Convention; and UNEP documents.*

## **Chapter 5**

### **Proposal for improving marine environmental protection management in Cambodia**

As the Cambodian environment is under threats caused by various factors including pollution (see Chapter 3), Cambodia should consider initiative proposals for preventing and responding to marine environmental pollution, preserving marine resources for both living and non-living resources, and improving the quality of the ocean. The appropriate proposal for improving the marine environment in Cambodia is strengthening environmental management, maritime administration, legal instruments, and establishing a responding organization to pollution incidents.

#### **5.1 Strengthening environmental management**

The Ministry of Environment (MOE) is responsible for overall environmental management in Cambodia. Concerning the current degradation of the marine environment, and expected further destruction/pollution from landbased and maritime activities, the MOE should take the necessary measures to prevent and respond to such pollution incidents and preserve marine resources.

First of all, MOE should improve the current work, performed by technical line departments (Department of Nature Conservation and Department of Pollution Control Management). Secondly, environmental capacity building among the officials should be strengthened and environmental awareness among the public should be improved. Thirdly, Centers for Environmental Education and Marine

Research and Development should be established. Finally, contingency plan response to oil pollution incidents should also be developed.

#### **5.1.1 Marine natural resources management**

- MOE should immediately prohibit all illegal activities (hunting, fishing and cutting mangrove), which cause damage to the marine environment, fauna and flora, marine biodiversities, and their habitats. Routine and/or random surveys and patrols along the coastline, in mangrove forest, and at sea should be performed by MOE staff in order to find, detain, and/or seize wrongdoers (who caused damage to the environment) to be fined or prosecuted.
- MOE should coordinate and cooperate with the Ministry of Agriculture, Fisheries and Forestry (MAFF) to consider the capacity, types, and size of the fish allowed to be caught. The discharge of wastewater from fish farms should be taking into account in order to prevent further damage to the marine environment.
- MOE should issue codes, standards, and circulars (based on the national laws, and international conventions and agreements) for the management of exploitation of marine resources, and effectively implement such codes, standards, and circulars.

#### **5.1.2 Marine pollution control management**

- MOE should carefully and strictly implement sub-decrees on solid waste management, and waste water management.
- Direct discharge of wastes (wastewater and solid wastes) from factories, fish farms, other fabrications, and ships should be prohibited, unless the wastes have been treated.
- MOE should coordinate and cooperate with the Ministry of Public Works and Transport (MPWT), and other governmental agencies including municipalities, and Custom agencies, to control all imported goods because some are required to be disposed due to poor quality. Further consideration should be focused on the

importing of waste for other purposes including incineration, used as second hand material, and dumping.

- MOE should coordinate and cooperate with MPWT, municipalities, and the Ministry of Industry, Mines and Energy (MIME) to develop regulations, decrees, sub-decrees, codes, standards, and circulars for the pollution control management and discharging of wastes from all kinds of vehicles including ships, residential areas and industries.
- MOE should coordinate and cooperate with MPWT to develop an effective contingency plan to respond to oil pollution incidents.

### **5.1.3 Establish a Center for Environmental Education**

Environmental awareness among the officials and public is very limited and causes threats (both direct and indirect activities) to the environment including the marine environment (see Chapter 3). Therefore, sustainable development of the marine environment and its quality would not be achieved unless the public awareness and the capacity building of officials have been improved.

Unfortunately, there is no center for environmental education in Cambodia yet. In order to improve the officials' capacity building and the public's awareness of environmental issues, MOE should establish a center for Environmental Education (CEE). This center should be under the responsibility of the Department of Education and Information, and should set out the following objectives:

- To develop an action plan for environmental education including follow up activities and environmental campaigns.
- To develop adequate environmental educational resources (materials) convenience to apply with all systems of education.
- To conduct environmental education and training programs for the officials and public. Follow up activities should also be taken into account.
- To coordinate and cooperate with the Ministry of Education, Youth and Sport (MOEYS); MPWT, MAFF, MIME and other governmental institutions for conducting environmental training programs for the officials.

#### **5.1.4 Establish a Center for Marine Research and Development**

There is shortage of information and data, so far, related to the seabed, marine resources, biodiversity (fauna and flora), coastal resources and its ecology, and geography of the Cambodia Sea. Lacks of these information, lead Cambodia unable to well management of marine and coastal resources including the preventing of pollution from land based and marine activity.

Therefore, for the effectiveness of marine environmental management and the sustainable use of marine resources development, Cambodia (MOE) should consider the establishment of a center for Marine Research and Development (CMRD). This center should also be under the responsibility of MOE and focus on the main objectives such as the following:

- To protect the virginity of marine environment,
- To promote marine sustainable resources development,
- To improve the quality of marine development, coastal zone management, and high seas management,
- To do marine scientific research and technology, and
- To provide marine environmental education and training.

In order to achieve the above objectives, MOE should take into account the following issues such as marine and coastal resources management and development (industries, tourism, and recreation), the quality of marine environment, high seas and coastal zone management, and marine science, research, and technology. Furthermore, this institute should consider further issues including marine industries, ocean law and policy, and marine transportation.

Therefore, aside from the prevention of marine pollution, MOE should further consider preserving marine resources, both living and non-living, to enhance the standard of living of the people along the coastline. Launching an integrated coastal management program is the fundamental project for managing the marine ecosystem. There are five main areas concerned with these programs including improving the scientific and information base, improving institutional arrangements, participation

and consensus building, capacity building through training and education, and financing and implementing management strategies.

Developing and effectively conducting this program is fundamental work for enhancing the marine environment and ensure the sustainable use of marine resources and development.

## **5.2 Strengthening Cambodia's maritime administration**

Human factors and/or substandard ships are the main source of maritime casualty incidents and cause of pollution damage to the marine environment. To prevent such pollution incidents, MPWT should strengthen maritime administration focusing on the following fields.

### **5.2.1 Strengthening the Merchant Marine Department**

Cambodia Merchant Marine Department (MMD) was established on April 5, 1999 (Declaration No. 189). This department consists of the following five technical divisions:

- Division of Registration, Seaman and Certificate (RSC).
- Division of Planning and Legal Affairs (PLA)
- Division of General Affairs (GAD)
- Division of Port/Flag States Implementation (DPFSI). (Cambodia Port State Control and Flag State Control just transferred to the MMD in mid 1999).
- Division of Coastal State Control, and Search and Rescue (CSC & SAR)

#### **5.2.1.1 Improving Flag State Control**

The number of Cambodian ships' flag detained by other Port State Controls is too high, about 30.04% of the total number of inspected ships (Tokyo MOU report, 1999). This means that Cambodia Flag State Control (Cambodia Ship Open Registry (CSOR), run by the private sector) may not perform its duty properly. As a member State to IMO, and other conventions including the SOLAS, MMD should take immediate action to control CSOR and find the deficiency of this authority. The

recommendations and guidelines should be provided to CSOR for improving the overall work such as controlling certificates, ship conditions, and crew, in order to comply with international standards and requirements.

#### ***5.2.1.2 Improving Port State Control***

Many substandard ships are sailing within the Asia Pacific Region, including Southeast Asia, and the number of ships calling at Cambodian seaport (Port of Sihanoukville) are increasing every year. To avoid maritime casualty incidents caused by these substandard ships, Cambodia Port State Control (CPSC) should improve their duties by strictly and carefully control the ships before allowing them to leave the port. Detention of ships at port is an appropriate measure to take if a clear ground of substandard points has been recognized. Ships would be allowed to sail again when they have fixed all requirements according to the International standards and/or national standard regime. Moreover, CPSC should cooperate with and assist MOE officers to control normal operational discharge from ships.

#### ***5.2.1.3 Strengthening Cambodian CSC & SAR***

Cambodia established Coastal State Control, Search and Rescue Division (CSC & SAR) in 1999. The main role of this division is to perform search and rescue services and provide assistance to maritime casualty emergencies. A further role is to inspect ships sailing within Cambodia waters, in order to protect the interest of the State and to strengthen the enforcement of IMO conventions. Therefore, this division needs to be provided with the necessary resources including office supplies, equipment, finances and manpower. Technical assistance and cooperation are also needed to strengthen and improve these services.

#### ***5.2.1.4 Improving capacity building of the officers***

MMD is a relatively new department but lacks resources including manpower and competent officers. Therefore, the capacity building of these officers and decision-makers should be provided in order to be able to perform their jobs

properly. Basic knowledge to be provided to those officers is related to general maritime issues, PS/FS implementation skills, search and rescue capabilities, and other skills in which it is convenient to implement national regulations, and international conventions and standards. MMD officers are required to get assistance, technology and cooperation from other States and IMO in order to improve their capacity building.

### **5.2.2 Establishment of wastes disposal facilities**

The Cambodia seaport does not have facilities for wastes disposal yet. So the Sihanoukville port authority should consider the establishment of wastes disposal facilities in its own port. Types and categories of wastes should be shorted in which is convenient to be treated and/or disposed. Wastes from normal operations are allowed to be discharged at the port in order to prevent dumping of wastes at sea.

### **5.2.3 Cooperation with other agencies**

MPWT should strengthen its external cooperation with other national governmental agencies, particularly MOE and international agencies (maritime administration authorities) to prevent and respond to marine pollution incidents from ships. The necessary issues to be concentrated on are the following points:

- Minimizing the risk of environmental damages from transportation accidents particularly oil spill incidents.
- Reducing air emissions from transportation sources.
- Cooperating and coordinating with MOE to develop a contingency plan to respond to oil pollution incidents, both from coastline and sea source accidents. MPWT particularly CSC & SAR Division should be responsible for implementation of this plan and lead the combating site.
- Providing transportation facilities including ships, tugboats, as well as containment and recovery equipment to combat oil spills and other pollution incidents.

### **5.3 Strengthening legal instruments**

The legal instruments for environmental protection management including the marine environment in Cambodia are not adequate yet. Therefore, the government of Cambodia, especially MOE and MPWT should consider issuing new legal instruments, amending some of the legislation, and implementing them carefully, strictly, and effectively.

#### **5.3.1 Issuing new legal instruments**

Understanding that, Cambodia does not have adequate laws, regulation, codes, standards and guidelines for the effectiveness of management and administration of natural environment. Therefore, the MOE should consider for developing necessary laws, regulations, standards, codes, and guidelines, which is convenience for the management of environment. Example, MOE should consider for developing regulation related to air pollution prevention, hazardous substance management, and inspection jurisdiction regimes.

With respect to environmental issues, MOE should cooperate with other governmental ministries and agencies to monitor the implementation of some legislation relating to the environment. This legislation includes forestry law, law on petroleum exploration and development, mining law, sub-decree on national committee on land use, urbanization and construction, and sub-decree on construction permits.

MOE should further consider the issuing of legislation, codes, standards, circulars, and guidelines, which are related to marine environmental issues. Such codes, standards, circular, and guideline should integrate global environmental concerns that are related to the marine environment. These environmental concerns were mentioned in the international conventions and agreements, which were ratified by the Government of Cambodia.

### **5.3.2 Ratification of international Conventions and agreements**

The international community has developed plenty of international conventions and agreements (chapter 4) for the purpose of preventing marine pollution, and of the sustainable use of marine resources and development including the necessary measure to combat marine pollution incidents.

Cambodia is a member of the United Nations and IMO but has ratified few conventions. Therefore, in order to cooperate with the international community, the Government of Cambodia should immediately ratify the rest of the conventions and agreements, which give opportunity for technical ministries to work in harmony with other countries fighting marine pollution incidents. Such conventions and agreements needed to be ratified are the following:

- Basel Convention on the control of transboundary movement of hazardous wastes (Basel Convention)
- International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC, 1990 Convention)
- International Convention related to Intervention on the high sea in case of Oil Pollution Casualty (Intervention Convention)
- London Dumping Convention.
- The International Convention on Liability and Compensation for damage in connection with the carriage of Hazardous and Noxious Substances by sea (HNS 96, Convention)
- The International Convention on the establishment of an International Fund for Compensation for Oil Pollution Damage (Fund convention)
- United Nations Convention on Environment and Development (UNCED or Agenda 21 or Earth Summit 92)
- United Nations Convention on the Law of the Sea (UNCLOS 82 convention)
- And other bilateral, multi-bilateral, regional agreements concerned with marine environmental issues.

### **5.3.3 Implementation**

Only development of some national regulations and ratification of some international conventions related to marine pollution incidents and casualties is not enough without implementation. Effective and strict implementation of such regulations, conventions and agreements is the essential measurement for preventing of and responding to marine pollution incidents. An implementation regime should be organized and performed at management and operation levels. MOE and MPWT are the main governmental bodies responsible for such implementation of national regulations and international conventions and agreements.

## **5.4 Proposal for developing a contingency plan**

Cambodia's crude oil will be exploited in the near future and the movement of this oil will be introduced. When the movement of crude oil starts in the Cambodia Sea, marine pollution incidents may occur and cause great damage to the marine environment. Therefore, MOE and MPWT should consider appropriate measures responding to such pollution incidents. The appropriate measure is a contingency plan against oil pollution and responding organization.

### **5.4.1 Contingency plan regime**

Contingency plan responses to oil pollution should be developed by MPWT in collaboration with MOE, responsible for the task at national and local levels. The national plan would be responsible at a higher management level while the local plans would be developed and responsible at local levels of an organization (authorities). Contingency plans should be concentrated on the responding regime, which is trying to minimize the scope of pollution damage, fast response to the incidents, and the minimum of manpower, financial and equipment to be used. Elements for the responding regime are the following:

#### **5.4.1.1 *Responding organization***

The responding organization should be carried out by MPWT (CSC & SAR Division) and should be large enough and authorized to be responsible for the following duties.

- To collect and disseminate information about the actual or threatened pollution. The transmission of instruction and information should be distributed via adequate communication facilities to responding teams.
- To coordinate the activities of other agencies and be capable of controlling numbers of personnel and variety of equipment.
- To prepare available resources (manpower, equipment and materials, and finances) and appropriate techniques for combating oil spill pollution incidents.

#### **5.4.1.2 *High priorities areas to be protected***

Considering the priority areas (sensitive areas) to be protected is the main objective of contingency plans. The priority areas to be highly protected are the following:

- Marine national parks and protected areas.
- Fisheries and mariculture farms.
- Marine wetland and wildlife sanctuaries.
- Recreational and amenity beaches.
- Residential areas.

These sensitive areas should be mapped and listed their priority to be prevented and responded. The means of creating and mapping these areas is firstly saving available resources including manpower, materials and finances during clean up operations. Secondly, workload for cleaning up operations should be reduced, and finally, vulnerable environmental resources such as marine biodiversities, fauna, and flora from pollution incident should be prevented.

#### ***5.4.1.3 Material and equipment resources***

Available materials and equipment resources should be considered in advanced, which is convenient to response to any pollution incident. Such materials and equipment needed to be prepared are booms, skimmers, vacuum pumps, and other barriers, which are convenient to protect oil spill movements.

#### ***5.4.1.4 Communication facilities***

It is very important to create communications systems and procedures, in whereby it is convenient for the On-scene Commander to gather information and contact field sites, vessels, and aircraft during operation. Essential communications facilities such as telephones, radios communications systems, fax machines, computers and networks, and other equipment should be installed within the center (coordination center).

#### ***5.4.1.5 Disposal facility and transportation***

The plan should carefully consider the appropriate site to dispose the recovered oil and oily debris. This site should be a temporary storage site and a permanent disposal site should be considered concerning the nature and degree of contamination of oil, which may produce risk to the environment. Necessary resources to transport any recovery oil and debris should also be considered and prepared in advance.

### **5.4.2 Responding organizations**

MOE and MPWT should consider the effectiveness of implementing such contingency plan, but the site of responsibility should be divided. In convenience sense, MOE should be responsible for pollution on land and coastline (oil came ashore) and the MPWT should be responsible for pollution at sea and lead the overall work. Harmonizing work and cooperation with other governmental agencies and private industries are the core issue for implementing contingency plans. The

appropriate agencies and industries and their duties that may be involved with the plan are the following:

- Ministry of Public Works and Transport (CSC & SAR Division) dealing with overall work and lead organization.
- Ministry of Environment, dealing with technical matter.
- Ministry of Defense,
- Ministry of Interior (police, and fire department)
- Ministry of Agriculture, Fisheries and Forestry
- Ministry of Rural Development
- Municipal authorities
- National Committee for Disaster Management
- Oil Industries.

These agencies and industries should be assigned their work responsibilities. Internal cooperation among these agencies at national and local levels is the main issue for preparedness and response activities.

In summary, there are four broad areas for concentrating on enhancing the Cambodian marine environmental management. The first area is improving environmental management, particularly the marine environment. This duty is under responsibility of the MOE, primarily focusing on strengthening its technical department work, establishing centers for education and training, and center for marine research and development. An integrated coastal management program has also been taken into account by the MOE.

The second issue deals with the strengthening of maritime activities for all related areas including improving FSC, PSC, CSC and SAR, capacity building of the officials, and establishing waste disposal facilities at the port.

The third issue deals with legal instruments, which are recommended to issue the necessary regulations for effective management of marine resources and

prevention of the marine environment from pollution. Suggestions for ratification of international convention and agreements are also added to this part.

The final issue deals with contingency plans for combating marine pollution, particularly oil spill from ships.

All the above issues are so important for enhancing the Cambodian marine environment and would be recommended considering by the government, particularly, by the MOE and MPWT. Recommendations for improving the marine environmental management in Cambodia will be provided in Chapter 6 and indicated the important matters for enhancing the management of the marine environment.

## **Chapter 6**

### **Recommendations and Conclusion**

#### **6.1 Conclusion**

In conclusion, it can be assumed that the marine environment in Cambodia is under threats caused by economic factors and the development of the coastal zone. Furthermore, the management of the marine environment is not efficient due to lack of human resources, available data and information, and inadequate legislation and institutional cooperation. Therefore, in order to enhance marine environmental management, it is necessary to minimize or eliminate the threats to the environment and to strengthen the management work.

Minimizing or eliminating the threats to the marine environment is basically dependent on national legislation, its implementation and enforcement of that law. The penalty principle is not a good way to apply for banning illegal exploitations of marine and coastal resources because the local people (grassroots), whose daily income is very low, do those activities. On the other hand, the officials do not have the adequate capacity for and experiences in the management of marine environment. They have difficulty in interpreting and implementing the national regulations, including the enforcement of these regulations. Therefore, the awareness of marine environmental issues, including technical, legal and management skills are needed to provide to the officials, which to improve their capacity building.

As soon as the capacity of the officials is provided and improved, thus the management of the marine environment will be also improved. Providing such skills, a center for education and available information and data on marine

environment are needed. However, Cambodia does not have such thing so far. Therefore, it is necessary to establish a Center for Environmental Education (CEE) (dealing with the marine environment too) and a Center for Marine Research and Development (CMRD).

The main role of the Center for Environmental Education is to provide environmental knowledge and skills to the officials and awareness to the public, through education and training programs. On the other hand, the Center for Marine Research and Development will be responsible for research and development, which are convenient for the sustainable use of marine resources and development. Useful information and data collected by the center will be provided to CEE for delivery in the class. Furthermore, methods for preventing and responding to oil spill pollution will be studied by CMRD and used by the responding organization for combating the spill. Moreover, CMRD will also study the harmonic exploitation and development of the coastal zone for the sustainable use of natural resources. The result of this study will be used for promoting living standards of people, who live along the coastline, with no harm to the marine and coastal environment.

## **6.2 Recommendations**

In order to improve marine environmental management and to achieve the sustainable use of marine resources and development, the following recommendations are by provided:

### **6.2.1 Institutional matters**

- The Ministry of Environment should consider reforming and strengthening the current environmental management.
- The Ministry of Public Works and Transport should consider strengthening the maritime administration systems.
- The Ministry of Environment should coordinate and cooperate in harmony among the governmental agencies concerned with marine environmental

management issues, if convenient through the signature of cooperation agreements.

- The ministries (MOE and MPWT) should persuade the government to lobby through the international organizations (IMO, UNEP, UNDP) and agencies (DANIDA, JICA) for incorporation within the fields of the marine environment and the maritime sectors, as technical and financial assistance.

### **6.2.2 Legal matters**

- The ministries (MOE and MPWT) should prepare the necessary legal instruments such as codes, standards and circulars by integrating international conventions and agreements (see Chapter 4) into national legislation and regulations. Effective and strict implementation and enforcement of such legal instruments are the key issue for prevention and protection of, and responding to marine environmental pollution.
- The ministries (MOE and MPWT) should persuade the government to ratify international conventions and Agreements involved with marine environmental issues (see Chapter 5).

One of the most important international conventions needed to be ratified is the International Convention on the Law of the Sea (UNCLOS 82). This Convention provides economic benefits and sovereign rights to the Coastal State to take necessary action for protecting marine resources and the environment, which is laid down under part III “Protection and Preservation of the Marine Environment”, to the Convention. In general views “State has the obligation to protect and preserve the marine environment” (Article 192)

### **6.2.3 Technical matters**

- The ministries (MOE and MPWT) should develop contingency plans responding to oil spill pollution incidents at sea and/or on land including the establishment of responding regimes and organizations.

- The Ministry of Environment should immediately establish a Center for Environmental Education and a Center for Marine Research and Development. Both centers will play an important role in strengthening the capacity building of the officials and conducting marine research and development programs.
- The Ministry of Environment should consider launching an integrated coastal management program. This program should reflect the UNCED Agenda 21 and UNCLOS 82, in which convenient to enhance the marine environment and to ensure the sustainable use of marine resources and development for present and future generations.

All the above recommendations have not been classified by priority rank; however, it should be considered that these points are the key issues for improving marine environmental management in Cambodia.

For the final conclusion of this dissertation, the author sincerely believes that the marine environment in Cambodia would be improved throughout harmonic cooperation with the Ministry of Environment by all governmental institutions and interested parties. The principle of sustainable use of marine and coastal resources and development is the fundamental development of the country, particularly the marine coastal areas.

## References

- Aston, J. (1999). Experiences of coastal management in the Pacific Islands, 42, 483-502. Ocean and coastal management: the environmental issues of the Pacific Ocean on a regional perspective-the South pacific Region. New York: Elsevier Science Ltd.
- Basiron, M.N. (1998). The implementation of chapter 17 of Agenda 21 in Malaysia: challenges and opportunities, 41, 1-18. Ocean and coastal management. New York: Elsevier Science Ltd.
- Cambodia Working Group in Cooperation with Wetlands International (1998). Management of fisheries, coastal resources and the coastal environment in Cambodia: Institutional, legal and policy perspectives. Phnom Penh: Ministry of Environment.
- Carson T., Kim, N. and Nin, V. (1997). Coastal communities Cambodia: Research support activity. Phnom Penh: Ministry of Environment.
- Chanto, C. (1997). A poverty profile of Cambodia-1997. Phnom Penh: Ministry of Planning.
- EVS Environment Consultants Ltd. (1996). Coastal and marine environmental management for Kingdom of Cambodia. Phnom Penh: Ministry of Environment.
- Garcia, S.M. & Hayashi, M. (2000). Division of the oceans and ecosystem management: a contrastive special evolution of marine fisheries governance, 43, 445-474. Ocean and coastal management. New York: Elsevier Science Ltd.
- Group of experts on the Scientific Aspects of marine Pollution (GESAMP Report and Studies No. 5, 1993). Impact of oil and related chemicals on the marine environment. London: the International Maritime Organization.

- International Maritime Organization (IMO). (1969). International Convention on civil liability for oil pollution damage (CLC 69 Convention). London: Author.
- International Maritime Organization (IMO). (1969). International Convention relating to intervention on the high seas in case of oil pollution casualties (INTEVENTION Convention). London: Author.
- International Maritime Organization (IMO). (1988). Combating oil spill. Manual on oil pollution. (section IV). London: Author.
- International Maritime Organization (IMO). (1991). International Convention on the prevention of marine pollution by dumping of wastes and other matter at Sea, 1972 (the London Dumping Convention). London: Author.
- International Maritime Organization (IMO). (1991). International Convention on oil pollution preparedness, response and cooperation, 1990 (OPRC Convention). London: Author.
- International Maritime Organization (IMO). (1992). International Convention on the establishment of an international fund for compensation for oil pollution damage (FUND 92 Convention). London: Author.
- International Maritime Organization (IMO). (1995). Contingency planning. Manual on oil pollution. (section II). London: Author.
- International Maritime Organization (IMO). (1996). International Convention on liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea (HNS Convention). London: Author.
- International Maritime Organization (IMO). (1997). International Convention for the prevention of pollution from ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). London: Author.
- International Maritime Organization (IMO). (1998). Annex VI of MARPOL 73/78: regulations for the prevention of air pollution from ships and NOx technical code. London: Author.

- Lou, K. (1999). Sihanoukville activity's report. Phnom Penh: Ministry of Public Work and Transport, Port authority of Sihanoukville.
- Mangrove Working Group. (1995). Mangrove forest resources and local communities. Phnom Penh: Ministry of Environment.
- Ministry of Agriculture, Forestry and Fisheries, Fisheries Department. (1990). Fisheries laws. Second printed, 1995. Phnom Penh: Author.
- Ministry of Agriculture, Forestry and Fisheries, Fisheries Department. (1995). Fisheries annual report for 1994. Phnom Penh: Author.
- Ministry of Agriculture, Forestry and Fisheries, Fisheries Department. (1996). Fisheries annual report for 1995. Phnom Penh: Author.
- Ministry of Agriculture, Forestry and Fisheries, Fisheries Department. (1997). Fisheries annual report for 1996. Phnom Penh: Author.
- Ministry of Agriculture, Forestry and Fisheries, Fisheries Department. (1998). Fisheries annual report for 1997. Phnom Penh: Author.
- Ministry of Environment, National Environmental Action Plan. (1998). Cambodia national environmental action plan 1998-2002. Phnom Penh: Author.
- Ministry of Public Work and Transport. (1998). The rehabilitation of Sihanoukville port (phase II): the construction of container berth and terminal. Phnom Penh: Ministry of Public Work and Transport.
- National Institute of Statistics. (1997). Report on the Cambodia socio-economic survey 1997. Phnom Penh: Ministry of Planning, National Institute of Statistics.
- Royal Cambodian Embassy. (2000). Report on working activities of the Royal Government in 1999. Retrieved on April 9, 2000 from the World Wide Web: <http://www.embassy.org/cambodia/government/index.html>
- Ruddal Blanchard Association Ltd. (1995). Offshore Cambodia preliminary environmental assessment: Supplement for 1996 drilling campaign. Exploration drilling program for block I and II, offshore Cambodia. Phnom Penh: Enterprise Oil Exploration Ltd.

- Tokyo Memorandum of Understanding (MOU). (1999). Annual report on Port State Control in the Asia-Pacific Region, 1999. Retrieved on June 18, 2000) from the World Wide Web: <http://www.ijjnet.or.jp/tokyomou/annrep.htm>
- UN Convention on Environment and Development (UNCED Agenda 21), New York, United Nations, 1992.
- UN Convention on the control of transboundary movements of hazardous wastes and their disposal (BASEL Convention), New York, United Nations (1989).



## Appendix 02

### Organization of the Ministry of Environment (Technical Function)



## **Ministry of Environment Functions of the Technical Department**

### **1. Function of the Ministry of Environment**

- To exercise environmental policy with sustainable development and to propose the National and Regional Environmental Action Plans in cooperation with other ministries.
- To prepare and implement environmental legal instruments aiming to ensure sustainable development.
- To review and evaluate the Environmental Impact Assessment (EIA) of all proposes existing and on-going projects and activities, both public and private.
- To advise relevant ministries on the conservation, development, and management of natural resources as prescribed in Article 59 of the Constitution.
- To administer the National Project Areas System following the Royal Decree on the “Creation and Designation of Protected Areas” and to propose new areas to be put in the system.
- To prepare inventories, which describe the source, nature and amount of pollutants, and to take measures to prevent, reduce, and control environmental pollution.
- To prepare inspection procedures, as mentioned in Article 59 of the Law on Environmental Protection and Natural Resources Management.
- To prepare and conduct environmental educational programmes applying to all levels, including to local communities in cooperation with relevant ministries, national and international organizations.
- To compile, analyze and manage environmental data.
- To initiate and prepare any proposals to the Government to reach the goals of international agreements, conventions, and memorandum of understandings

related to environmental protection, and to implement such international instruments.

- To promote incentives to those investments which facilitate environmental protection and nature conservation.
- To cooperate with National Organizations, NGOs, foreign governments and local communities in order to ensure the environmental protection in the Kingdom of Cambodia.

## **2. General Directorate**

The General Directorate is led by a Director General and his deputies. The General Directorate consists of six line departments:

- Department of Planning and Legal Affairs
- Department of Nature conservation and protection
- Department of Pollution Control
- Department of Natural Resources Assessment and Environmental Data Management
- Department of Environmental Education and Communications
- Department of Environmental Impact Assessment Review.

## **3. Department of Planning and Legal Affairs**

The Department of Planning and Legal Affairs, in collaboration with MOE line departments, is responsible for

- Developing legal instruments for implementing the Law on environmental Protection and natural Resources Management;
- Collaborating, reviewing and advising on the development of legal instruments by other government institutions related to the Ministry's mandates;
- Providing legal counsel to the MOE Senior management and assists the line Department in exercising authorities conferred by the environmental law;

- Developing policies for environmental protection, in collaboration with other concerned government ministries, conservation and the sustainable use of natural resources;
- Coordinating and facilitating the Ministry's role in preparing national and regional environmental (action) plans;
- Coordinating and overseeing strategic and operational planning and program evaluation within the Ministry;
- Coordinating with Department of Administration, Finance and Personnel in preparing proposal for the MOE annual budget and its allocating and advising the Minister;
- Coordinating multi-lateral and bi-lateral assistance activities to ensure that they address Ministry objectives, policies and priorities;
- Supervising the preparation of periodic department progress reports.

#### **4. Department of Nature Conservation and Protection**

The Department of Nature Conservation and Protection, in collaboration with MOE line departments, is responsible for

- Assisting the Royal Government meets its commitments and responsibilities under international agreements, conventions and protocols pertaining to nature conservation and protected areas;
- Developing policy, preparing and implementing management plans, for operating the Kingdom's designated national parks, wildlife sanctuaries, protected landscapes areas and multiple use management areas as demarcated in the Royal Decree dated 01 November 1993 on the Creation and Designation of Protected Areas in collaboration with those government agencies designated in the Royal Decree, and recommending the establishment of new protected areas;
- Collaborating and consulting with, and providing guidance to relevant government ministries for the protection and conservation of valuable

ecosystems, such as wetlands and watersheds within buffer zones and other areas lying outside of the Kingdom's protected area system;

- Encouraging the participation of communities, the general public, related institutions, national and international organizations, and NGOs in the management and conservation of Cambodia's natural resources.

## **5. Department of Pollution Control**

The Department of Pollution Control, in collaboration with MOE line department, is responsible for

- Assisting the Royal Government meets its commitments and responsibilities under international agreements, conventions, and protocols pertaining to environmental quality protection;
- Developing an inventory of the sources, types and quantities of all solid and liquid wastes, pollutants, toxic and hazardous substances, emissions, noise and vibration, in collaboration with concerned ministries;
- Developing and implementing sub-decrees and other legal instruments for protecting the quality of the environment and for controlling pollution throughout the Kingdom;
- Monitoring and reporting the current status of environmental quality including air, water, soil and noise pollution to the general public;
- Proposing procedures for inspecting pollution sources and reporting on offenses to competent authorities;
- Inspecting pollution sources and reports on offenses to the competent authority in collaboration with the ministries concerned;
- Enforcing the law as prescribed by Chapter 9 of the Law on Environmental Protection and Natural Resources Management.

## **6. Department of Natural Resources Assessment and Environmental Data Management**

The Department of Natural Resources Assessment and Environmental Data Management, in collaboration with MOE line departments and other institutions concerned, is responsible for

- Collecting and managing environmental quality and related socioeconomic data;
- Identifying the status of and trends in natural resource use and conservation, environmental quality and related socio-economic data;
- Providing data and information on natural and socio-economic resources, and environmental quality to line departments and concerned institutions;
- Preparing an annual State of the Environment Report and other reports required to meet the Kingdom's commitment to international environmental agreements.

## **7. Department of Environmental Education and Communications**

The Department of Environmental Education and Communication, in collaboration with MOE line departments, is responsible for

- Implementing environmental education programs (formal and non-formal) among all sectors of society;
- Developing and disseminating information on environmental issues, conditions and initiatives through the mass media, publications, and other channels;
- Promoting special activities and events to encourage public participation on the protection of environmental quality and conservation of natural resources;
- Initiating and coordinating environmental training initiatives within the Ministry and with other Ministries and institutions.

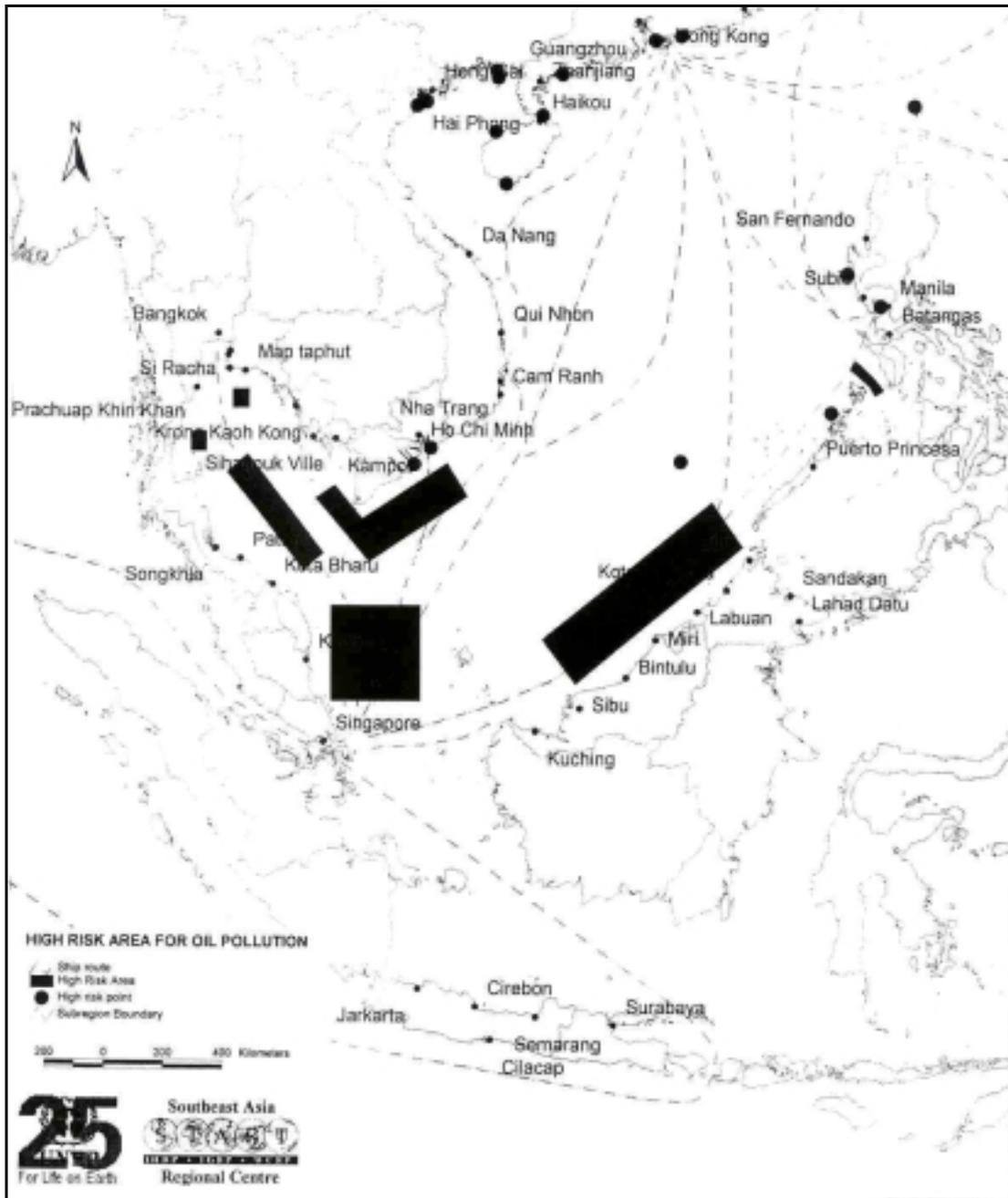
## **8. Department of Environmental Impact Assessment Review**

The Department of Environmental Impact Assessment Review, in collaboration with MOE line departments, is responsible for

- Reviewing assessments of the environmental impact of proposed and current public and private sector development projects or activities, and for making recommendations based on its review to competent bodies;
- Preparing proposals for sub-decrees concerning the procedures and scope of the Royal Government's environmental impact assessment progress;
- Preparing and maintaining an "inclusion list" of projects for which environmental impact assessments will be required;
- Preparing guidelines on the preparation of environmental impact assessments;
- Promoting public participation in the environmental assessment process;
- Monitoring the implementation of projects to mitigate negative impacts on the environment.

### Appendix 03

### High Risk Area for Oil Pollution in the Gulf of Thailand



Source: UNEP poster, the 25<sup>th</sup> Anniversary.