

REVIEW OF COASTAL ZONE MANAGEMENT IN FISHERIES OF CAMBODIA

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■ BACKGROUND

Cambodia is one of countries located in Indochina, in which covers area of 181035 km² and shares its 2428 km land border with Thailand on the north-west, Lao PDR on the northeast and Vietnam on the east and south. Extending of 435 km at southwest of Cambodia along the Gulf of Thailand, the coastal zone contains extensive forest, bays and beaches with several offshore islands.

Marine fisheries of Cambodia is considered a crucial resource for the local people's consumption, while the population increase, poor management, lack of law enforcement and uneducated it puts much more pressure to these natural resources. In addition the relevant institutions cooperated to manage marine resources in sustainable use. The Ministry of Environment and Fisheries of Department under the Ministry of Agriculture, Forestry and Fisheries had carried out to manage and save natural resources in the coastal zone by creating the Protected Areas, Community based natural resources management, strengthening law and law enforcement.

Although natural resource management at the coastal zone of Cambodia seems to be lack if compared inland fisheries or fresh water fisheries, that 13 Protected Areas called "fish sanctuary" were established by the Department of Fisheries at the end of civil war in 1979. The fish sanctuaries had been established in the Tonle Sap great lack, Mekong system including the deep hold reserve on the mainstream between Kratie and Khone Falls. These sanctuaries are to preserve inland fish brood stock for spawning and nursing from one flooding season to next one. Fisheries law 'KRET-CHHBAB/33 Kra. Char/9 March 1987 on Fishery Management

in Cambodia" is strictly forbidden of all fisheries activities in fish sanctuary except scientific research conduct by the Department of Fisheries with special permission. While, the Department of Fisheries under the Ministry of Agriculture, Forestry and Fisheries have protected of inundated forest within the Tonle Sap, River, Lack, National park and mangroves forests along the coast where the fish ground, fish sanctuaries and diver habitat or aquatic species nursery function located and had also prohibited on activities to destroy ecosystem as well cutting flooding forest and mangroves.

The Ministry of Environment (MoE) has conducted 23 Protected Areas to conserve all wild life including fish and their habitat but it is not designed as fish sanctuaries, in this case, the MoE protected areas contribute to localize fisheries productivities by maintaining river, lake and coastal habitat. There are seven of the MoE protected areas are associated with major natural water systems, four Protected area with marine ecosystems and three other with fresh water ecosystems. Also, the Ministry of Agriculture, Forestry and Fisheries has recently established the Siru Crane Reserve at Ang Tropeang Thmor which is a significant wetland and fisheries center.

On the first of November 1993, the Royal Degree concerning Creation and Designation of Protected Areas was established. This define four National Parks within the coastal areas (Ream Phnom Boko, Botum Sakor and Kep) and part of fifth (Kirirom) altogether covering of 366,250 ha, and one wildlife sanctuary and part of a second (Peam Krasob and Phnom Samkos) with altogether cover area of 357,500 ha, and a multiple use area (Dang Peng) covers area of 27,700 ha.

Coastal zone management established by MoE and Ministry of urbanization and planning focus only on the development of infrastructure, encouraging standard of living and use of natural resources in sustainable. The MoE had conducted several researches on social economic survey including pilot projects.

Fishery of Cambodia plays a very important role for food supply to people. The fish production is dominated by the fresh water fish production, while the marine productivities were considered when the natural stock of fresh water fish declined. According to statistic of DoF in 2001 shown that the marine production is 42,000 tons compared to inland fisheries 385,000 tons.

There are many types of small-scale and large scale (commercial scale) fishing gears were used in Cambodia water. The small-scale fishing gears were used for household consumption and size the gears are small. While the most of the fisherman used small-scale fishing gears they are pourers, the large scale fishing gears were used by the businessmen. The construction of the household fishing gear is depending on their purpose. Most hand made fishing gears were made by using natural resources it's called stationary fishing gear.

When most of coastal zone management was concerned the survey only on social economic and livelihood of local people in coastal zone by the MoE; the DoF under The Ministry of Agriculture, Forestry and Fisheries, had cooperated with United Nation Environment Program (UNEP) to conducted the survey under water resources. Coral Reefs and Seagrass play a crucial for nursing ground, sanctuaries function for aquatics resource and integrated biodiversity, however, it is very little known about these ecosystem due to lack of research. Furthermore, the sites of the coral reefs and seagrass have been not completely identified. According to the small survey, coral reefs have been observed to occur in many locations in coastal water of Cambodia, generally around the inshore islands and in some rocky areas. In Shihanoukville, coral reefs have grown

around most of the islands and estuaries in Koh Rong and Koh Rong Sonlem Group and the other island in Kompong Sam bay. Artificial reefs have been not implemented yet in the coastal water of Cambodia.

In cooperation between DoF with ICRAN under UNEP, the Marine Protected Areas (MPA) in Koh Rong and Rong Sonlem group of Kompong Som Bay, was established in 2002, it is under implementing activities. The coral reef and ecosystem in this area were concerned to manage in sustainable use for people depending on community based natural resource management.

■ OVERVIEWS LEGISLATION OF CAMBODIA

1. National Policy

There is no national policy specifying the development, use and management of specific natural resources in the coastal zone, especially coral reef and sea grass. However, the national program to rehabilitate and develop Cambodia has implication for development and management of the coastal zone. The national program reflects a policy based on a process of legal reform, established of a legal framework based on democracy and a market economy. It is also sets the framework for national policy in all sector related in Cambodia's coastal zone.

The Five-year socio-economic Development Plan (1998-2002) considers environmental protection to an equally important element to develop the country. This plans also emphasis the need to alleviate poverty and improve quality of life of rural communities. In addition to the general national policy, there are some important sectoral policy related to the management of fisheries, coastal resources and coastal environment.

1.1 Fisheries Policy

The mandate of DoF is to manage fisheries sector. The main element related to marine fisheries is:

- Provide job opportunities and improve livelihood of people in rural communities;

- To provide the access to and distribution of fisheries benefits include export earning

- To extend the institutional responsibilities of fisheries management to the fishing communities

- To improve the protection of fisheries resources in sustainable way

- To encourage the integration of fisheries resource management with rural development in fishing communities.

Local communities and authorities are now working together to management fisheries resources in the coastal of Cambodia. One objective is to designate zone that should be reserved for conservation as well as those to be kept open for sustainable use.

1.2 Industrial Sector Policy

The policies of the industrial sector are defined as follows:

- To ensure the development of industry on political, economic and social stability in order to reduce the trade gap;

- To develop an industrial base to maximize the benefits of the existing natural resources, attracting greater foreign investment, promoting technology transfer and stimulating human resource development;

- To support the goals of the Ministry of Education and other agencies in developing vocational training centers to provide trained personnel for industrial development;

- To increase effectiveness, competitiveness and modernization of industry within the context of a free market economy;

- To support national economic and social development through effective industries, by creating added value to natural resources, sustainability of economic development, job opportunities and thereby upgrading the living standard of the people;

- To develop a Petroleum Training Institute and a training institute in the mines and geology sector; and

- To develop agro-manufacturing and food processing industries to support the agriculture sector.

1.3 Tourism Policy

Regarding to the management of tourism, the Ministry of Tourism (MoT) has set up the following tourism policy:

- To increase foreign exchange earnings;

- To increase and encourage investment in all areas of tourism;

- To create employment opportunities for local people;

- To enhance and preserve the national cultural heritage; and

- To develop and conserve the physical and environmental resources in the coastal areas.

1.4 Policy of the Ministry of Public Work and Transportation

The main objective of Transport development includes the following policies:

- To upgrade the port facilities and infrastructure of Phnom Penh and Sihanoukville ports;

- To reconstruct the southern and northern railway branches; and

- To develop Phnom Penh and Sihanoukville ports as dry ports in order to accommodate future growths in traffic demand, especially with reference to container traffic.

1.5 Environmental Policy

The objectives of this policy are based on the Law on Environmental Protection and Natural Resource Management and the National Program to Rehabilitate and Develop Cambodia.

- To implement the national policy or national programs;

- To protect the environment from the effects of economic development;

- To conserve the environment by creating of protected areas;

- To ensure the development and implementation of laws and sub-decrees on

environmental conservation and protection of the coastal environment;

- To prepare and implement national and regional action plans through inter-agency coordination; and
- To ensure sustainable economic development activities in order to promote economic, social and political stability.

According to the unclear policy or responsibilities at ministerial levels, it may be difficult for departments or local authorities to define their own responsibilities or functions. However, the uncertain situation exists despite the fact that the National Environmental Action Plan (NEAP) was prepared by representatives from the following Ministries:

- Agriculture Forestry Fisheries
- Tourism
- Industry Mines and Energy
- Environment
- Rural Development and
- Public work and transportation

2. National Legislation Framework

2.1 Constitution of Cambodia

The National Assembly adopted the Constitution of Cambodia on 22 September 1993. It is the supreme law of the land and all other legislative texts have to strictly conform to this. “The Government of Cambodia must protect the environment and maintain ecological balance (Article 59 of the Constitution).

The Constitution refers three levels of power – legislative, executive and judicial. Legislative power has 120 members of the National Assembly who are elected for a term of five years by universal adult suffrage. The Royal Government of Cambodia is known as executive power. The head of the judiciary branch is the Supreme Council of the Magistracy.

2.2 Fisheries Law

There is under draft of new fisheries law under supported by World Bank project. However, the Fisheries Law No. 33, passed in 1987 is still in the enforcement, which defines fisheries and categorizes fishing

areas. It states that all entities or persons who fish in either freshwater or seawater must contribute to the state, except fishing for household subsistence. Fisheries exploitation and aquaculture in fishing areas are permitted but must be determined by regulations of the government of Cambodia.

The Fisheries Law aims at being sustainable of exploitation of Cambodia’s freshwater and marine fisheries resources. This law includes provisions addressing access control, gear restrictions, closed seasons and the designation of fish sanctuaries and also supports to the management of fisheries, coastal resources and the coastal environment in Cambodia as well as all types of inland waters. The management and administration of Coastal Fisheries of Cambodia is also mentioned in Fisheries Law, which includes the following:

- Fishery resources are comprised of living animals and plants found in the fisheries domain (Chapter 1, Article 1). Marine fisheries domain extends from the coastline to the outer boundary of the EEZ. Fisheries domain is the property of the state.

- Chapter 3, Article 22 of this law mentioned that fishery exploitation, aquaculture and processing in Cambodia’s marine fisheries are allowed upon government permission except for small-scale family fishing small-scale family fishing gear and other fishing gear permitted in the marine fisheries domain of Cambodia must be defined by the proclamation of the Ministry of Agriculture. However this law was not directly mentioned about the coral or sea grass management within marine water.

- Commercial fishing group or enterprise must obtain the following additional licenses: a fishing boat or vessel incense allowing them to operate in the sea, which to be issued by the fisheries authority after technical control, and a license from the police for administrative control (Chapter 3, Article 23).

- The fishing activities of foreigners in Cambodia’s marine fisheries domain must have the approval of the Council of Ministers (Chapter 3, Article 24).

- Fishers who are permitted in the marine fisheries domain must respect the order or act mentioned on the fishing license. Records must be kept on the daily catch of fish and other organisms, and reporting this monthly to the provincial municipal fisheries authority (Chapter 3, Article 25).

- All kinds of fishing gear, extending across a stream, inlet or navigable channel of coastal zones, must have a free space of one-third of its width during low tide to enable the navigation of vessels (Chapter 3, Article 26).

- Trawling in shallow water (less than 20 m) is prohibited, except where special permission is granted by the Department of fisheries for scientific research (Chapter 3, Article 28).

- Fishing in Cambodia by using electric fishing gear and all kinds of explosive or modern fishing gear, which are not mentioned in the Proclamation of the Ministry of Agriculture, are absolutely prohibited (Chapter 3, Article 29).

2.3 Forestry Law

The Forestry Management Law No. 35 was passed in June 1988, which defined as all types of forests and states that forests are divided into forest concessions and protected forests. Limitation of forest boundaries and forest uses are to be determined by a sub-decree. All sectors of society are obliged to protect the forests. Taxes of exploitation of forests must be paid to the government otherwise the logging operation are not allowed. Hunting of all species of animals is also prohibited.

2.4 Tourism Law

Royal Decree on the Establishment of the Ministry of Tourism was established on 24 January 1996. Its mission is to provide direction and encourage the development of the tourism industry in the Kingdom of Cambodia.

Sub-decree on the Organization and Functioning of the Ministry of Tourism

It was issued on 5 August 1997.

It defines the administrative structure of the MoT and its role and duty in tourism management. The organizational structure is composed of central and local administrations. The main responsibilities of the Ministry especially related to coastal tourism management are:

- To define the tourism policy and strategies and to prepare plans for tourism development;

- To encourage tourism investment in accordance with the national strategies;

- To develop and manage the tourism industry;

- To direct and administer other services related to tourism;

- To direct, control and maintain natural and artificial recreational resorts, tourism areas and tourism zoning in the Kingdom;

- To study proposals for establishing, recognizing and controlling private schools and professional training for the tourism sector;

- To promote tourism locally and overseas;

- To appoint tourism representatives in various countries in cooperation with the Ministry of Foreign Affairs and International Cooperation;

- To sign contracts that relate to tourism upon government approval;

- To issue operating permits for tourism firms, agencies and guides;

- To control tourism services and other tourism related activities; and

- To conduct tourism inspection.

With regard to issuing licenses, there are various declarations such as:

- Circular on the Licensing of Travel Agencies, 1994;

- Declaration on the Licensing of Tourist Guides, 1996;

- Declaration on the Licensing of Tourist Boats, 1996;

- Declaration on the Licensing of Tourist Vehicles, 1996;
- Declaration on the Licensing of Hotel and Guest Houses, 1996;
- Declaration on the Licensing of Resorts, 1996;
- Declaration on the Licensing of Catering Establishments, 1996; and
- Declaration on the Licensing of Massage Parlors, 1996.

2.5 Environmental Law

Law on Environmental Protection and Natural Resource Management

One of the national government's priorities is the development of environmental legislation. Law on Environmental Protection and Natural Resource Management is the first law specifically concerned with environment, which was adopted by the National Assembly on 24 December 1996. It can be considered as the framework for subsequent sectoral laws, sub-decrees and regulations for environmental protection and natural resources management.

The Law does not attempt to establish specific environmental management systems or standards. Rather, these tasks must be implemented by subordinate legal instruments. The main objectives of this law are to protect, manage and enhance the environment and to promote sustainable socioeconomic development. This law described the general legal framework of environmental protection, conservation and management of natural resources including coastal zone and marine resources.

The important objectives in this law are as follows:

- EIAs must be conducted for all projects and economic activities that might affect the environment (Article 6, Chapter 3);
- To conserve, develop, manage and use natural resources in a sustainable way (Article 8, Chapter 4);
- To protect the coastal environment through the identification of pollutants, toxic and hazardous substances (Chapter 5);

- To prepare national and regional plans for environmental protection and natural resources management (Chapter 2); and
- To suppress any acts which abuse the environment, in conformity with the "polluter pays" principles. Those who violate this law are to be fined and/or jailed in accordance with the degree of the violation.

Sub-decree on the Organization and Functioning of the Ministry of Environment

The Sub-decree on the Organization and Functioning of the MoE was ratified by the Council of Ministers in late 1997. Accordingly, the Royal Government of Cambodia gives the Ministry the authority to supervise and manage the environment in the Kingdom.

Royal Decree on the Creation and Designation of Protected Areas

Protected area management was mandated under the Royal Decree on the Creation and Designation of Protected Areas on 1 November 1993. There are 23 protected areas designated in the country and some of these protected areas are found along the coastline of Cambodia.

The MOE is currently preparing a proposal for a Sub-decree on Protected Areas Management. The purpose of this sub-decree is to implement the Law on Environmental Protection and Natural Resource Management and to implement the Royal Decree of 1 November 1993. At present, the MoE faces major management problems in the designated protected areas, especially in preventing violations such as illegal logging and hunting.

Sub-decree on Water Pollution

Control

A Draft Sub-decree on Water Pollution Control is under review by the MoE. The purpose of this sub-decree is to control effluent discharge into water bodies and set standards for water quality.

Sub-decree on Environmental Impact Assessment (EIA)

EIA provisions are incorporated in the Law on Environmental Protection and

Natural Resource Management. The draft sub-decree specifies the following environmental review process: screening, initial EIA and full-scale EIA.

As specified in the Law on Environmental Protection and Natural Resource Management, this review process applies to proposed, existing and on going projects and activities by both public and private sectors.

Where there is no requirement for an EIA, the Ministry will require the proponent to enter into an agreement to comply with any conditions set in the Ministry's initial evaluation as a precondition of granting any license or permit.

2.6 Transportation Law

In order to ensure safety in as well as develop other modes of transport, the MPWT has issued many laws and declarations, some of which are also related to maritime transport in the coastal zone.

- *Sub-decree on Private Transportation Services Passed in 1991 by state council No. 13*

- Declaration on the Management of Vehicles and Inland Waterways Transportation issued in 1993 by Ministry of Public work and Transportation

- Common Circular on Overloaded Trucks, Especially Logging Trucks issued by MPWT, MAFF, Financial and Economics in February 1995

- Declaration on Ship Construction by MWPT in 1995

- Declaration on Issuing Business Licenses for Tourist Boats Issued by MOT in 1996.

- *Sub-decree on River Navigation issued by council of Minister in 1986.*

- *Draft Declaration with Respect to the Act of Registration of Merchant Ships by GDT and MWTP in 1995.*

- *Declaration No. 018 on Overloaded Ferries, Riverboats and Sea-going Vessels by MWTP in August 1995.*

2.7 Land Law

The Constitution provides that only Cambodia citizens or entities have the right to

own land. The State of Cambodia's National Assembly passed the Land Law on 10 August 1992 and it is now being enforced. This law prescribes the management of land and the system of property rights such as state or private property. Private property rights in fisheries and forest reserves, however, are not provided.

2.8 Law on Land Management, Urbanization and construction

This Law was passed by the National Assembly and came into effect on 24 May 1994. It aims to promote the improvement of urban and rural areas in order to ensure sustainable development throughout out the Kingdom.

2.9 Law on Investment

The Law on Investment governs all investment projects initiated by investors who are Cambodian citizens and/or foreigners within the Kingdom of Cambodia. The National Assembly of the Kingdom of Cambodia adopted this law in August 1994 during the session of the first legislature.

2.10 Labor Law

This law governs all agreements between employees and employers who are Cambodian citizens and/or foreigners within the territory of the Kingdom of Cambodia. This Law was adopted by the National Assembly on January 1997 during the extraordinary session of the seventh legislature.

2.11 Industry Law

Law on Mineral Exploitation and Mining

The Law on Mineral Exploitation and Mining is still a draft and relates to the management and monitoring of mineral resources and mineral exploitation. It sets provisions for the sustainable development of the mining sector with the objective of improving the national economy but prevents natural resources depletion.

Sub-Decree on Industrial and Handicraft Management and Monitoring

This sub-decree is still a draft and relates to the management and monitoring of handicraft industries. It intends to promote sustainable development in the industry, improve the national economy and prevent harmful industrial impacts on the environment. The sub-decree was written in 1995.

Draft Industrial Zone Act

This act provides, written in 1995, for the development of the industrial zones in the Kingdom of Cambodia. It also aims to promote economic development in the industrial sector while maintaining environmental protection.

■ PROJECT ACTIVITIES IN COASTAL ZONE OF CAMBODIA

Natural resource management in coastal of Cambodia started in 1997 when the MoE cooperated with institution relevance including NGOs funded by DANIDA. The Coastal Zone Management (CZM) plays a very important role manage marine resource in sustainable use. In order to promote livelihood of the local lived in coastal area, there are some projects including pilot project were implemented in various place in province/municipality along the coastline of Cambodia. However, the project focus one the social and management in order to encourage and promote living condition of the local people. The objectives of the project as below:

- To investigated the ecological impact of the destructive fishing and coral collection
- To suggest management strategy to stop or regulate the destruction of coral reef
 - Infrastructure: capacity and socio-economic assessment
 - Assist local authorities to develop and maintain a monitoring program to track changes in specific habitats
 - Contribute to the development of coastal management strategies.

Therefore, from the purpose of the project and through the activities we got some out put as below:

- A functional policies and inst.

Framework for CZM

- Planning and integrated of Environmental management strategy at national and provincial levels including CZM action plans

- An approach for stakeholder participation in CZM process

- Standardized for collecting, analyzing and disseminating coastal inform

- Productive pilot projects with community-based management

- Pilot projects on waste management and monitoring

- Provincial working group coordinate, negotiate, plan and management

- Incorporate into existing institutional framework

- Physical framework plans for all four coastal provinces

- Guideline for community-base management

- Awareness raising

REAM National Park is one of five pilot projects located in Sihanoukville. The purpose of the pilot project is to improved living condition for local community fisheries trough patrolling as a mean to increase income from fishing, testing potentials of crab fattening as an additional income for household, enhanced public awareness on the environmental protection and improved community participation; and alternative livelihood possibility explored.

Based on natural resources management, this project shown the sign improving the natural resource and living condition as well. Reducing of environmental degradation is much appreciated; particularly the illegal activities as fishing and cutting mangrove forest in the pilot areas were reduced. Decreasing illegal fishing activities by the end of 2002 is 20-30% and the same as 50-60% for illegal cutting mangrove forests. Participating of stakeholders conducted regularly to solve any issues. Moreover, the cooperation between authority and community play very crucial in order to manage their natural resources in sustainable use.

■ STATIONARY FISHING GEARS

Introduction

There are many types of fishing gears used in Cambodia water. In order to tax from the Fishing activities the gears were classified into small-scale and large scale (commercial scale fishing gear), these gears are distinguished by the capacity of boat engines and size of fishing gears. In other hand, the fishing gears were divided into two groups is mobile (active) fishing gear and stationary (passive) fishing gear. The passive gears were made from the net and bamboo or small tree in different size.

1. Trap (Khmer name *Lop*)

There are many types of traps in Cambodia water. These gears are constructed from bamboo and small trees as born and covered by net. They also are operated with bamboo-fender and the small tree as born and covered by net. They also are operated with bamboo-fender and the production for their household consumption.

Crap traps (Khmer name *Lop Kdam*) were previously constructed from bamboo and now it's can made from the net. They keep trash fish inside trap and put in seagrass or estuaries where they considered as a good place to get crab.

Fish traps (Khmer name *Lop Trey*) were constructed by bamboo in various sizes. Generally, they operated in associated with bamboo-feder.

Squid traps (Khmer name *Lop Meuk*) are operated in associated with aquid eage, which are used for attraction. However, the data recorded by the DoF could not be separated by type of traps.

2. Gill net (Khmer name *Mong Peak*)

There also many types of gill net with various sizes can be used in Cambodia water. They catch different species and body sizes of the fish while the fish pass through it. These fishing gears were introduced in Cambodia along time ago and they are operated in the shallow or inshore water.

Mackerel gill net (Khmer name *Mong Trey Kamong*)

This fishing gear is specifically designed. It is used to catch pelagic fish especially mackerel, which comprises more than 80-90% of the total catch. According to the Fisheries Law of Cambodia (Khmer called *Kret Chhbab Lek 33 Kra. Chor*), which was signed and came into force on 09th March 1987, Article 27 mackerel fishing is prohibited every year from 15 January to 31 March because this is the spawning period for mackerel. In Cambodia, one fisherman has at least two types of the fishing gears, so they can change to another fishery during the closed season. This fishing gear is used only the fishermen who live in Sihanoukville municipality and Koh Kong province (Table. 2).

Scomberomorus gill net (Khmer name *Mong Trey Beka*)

This gill net is widely distributed in Sihanoukville and Koh Kong province (Tab. 16). One fishing boat has from 1 to 10 km of net depending on the size of the boat. For boats with engines from 10 to 90 HP, gill nets with a height of 9 m are used, whereas boats with engines bigger than 90 HP, use nets with a height of 18 m. On the bottom the gill nets are anchored or weighted and they are used to catch various pelagic fish species. The main fish species caught by this gill net are *Scomberomorus*, scads and shack.

Shrimp gill net or Trammel net (Khmer name *Mong Bang Kear*)

Trammel nets are widely used throughout Cambodian sea and more used in Sihanoukville and Koh Kong province (Tab. 4). This gear has a special design and consists of two or tree layers of different mesh size. For example trammel net tree layers, the layers 1 and 3 have a mesh size from 8 to 10 cm and layer 2 has a mesh size from 3.8 to 4.2 cm. This fishing gear is used for capture of mixed fishes but the most important is demersal fish because it is weighted to the bottom. It catches mainly shrimp, catfish and silver and black pomfrets.

Crab gill net (Khmer name *Mong Kdam*)

This is another type of gill net with various mesh sizes, which is operated in the shallow or inshore water like other gill nets and is weighted at the bottom. It is used to capture of mixed fishes but the most important is demersal fish, and especially crab. They have mesh sizes around 4-10 cm according to the depth or zone for fishing. Nets used in the shallow water have mesh sizes from 4 to 8 cm and 80% of the nets had a mesh size of 6 cm; 80-95% of the total catch is crabs. For deeper water (inshore) a mesh size of 8-10 cm is used and 80-90% of the catch is crabs.

Clupea gill net (Khmer name *Mong Trey Kborck*)

This is yet another type of gill net with various mesh sizes, which is operated in the shallow or inshore waters like other gill nets. It has a mesh size of 3.5 cm and is used to capture demersal fish especially Clupea. One fishing boat has from 150 to 200 m of this gill net and it is used all year round. It is used more for the fishermen who live in Sihanoukville (Tab. 6).

■ MARINE PROTECTED AREAS

Marine Protected area was established in 2002, which implemented by DoF and funded by ICRAND project under the United Nation Environment Program in Koh Rong site of Sihanoukville. It is the beginning time for activities that focus on protection and management the area of sea in which spawning ground, feeding grounds and nursing grounds for marine living resources to ensure their long-term viability and to maintain genetic diversity. Moreover, to promote compliance with MPA regulation by increasing income for local fishers through enhancement of local fisheries, training of alternative livelihood, and promote of ecotourism, and protecting coral reef and other diversity within the MPA.

1. Location of Koh Rong group

Koh Rong groups is in Mittapeap district about 28 Km from International Sea Port at the west of Sihanoukville. There are 5 villages in Mittapeap district, they are Preksvay, Deum Thkorv, Koh Touch, Koh Rong Sonlem and Soksan village.

2. Socio-economic status

There are 5 villages belong to Koh Rong Commune, Mittapeap District of Sihanoukville. Koh Rong commune just approve to be a commune, during 2000. One of the 5 villages (Sok San village) is still un-legislation.

The vast majority of the people in Koh Rong MPAs are fishing (70%) for their livelihood. The others grow rain season rice (rice field 100 ha) and farming (300 ha: coconut, mango, jack fruit, corn, water melon, banana, etc.) about 20% and 10% is goods sellers.

The standard living of the stakeholders are rich (Wooden house with tile roof, engine boat, TV, radio, etc.) is 16%, medium (Wooden house with tile roof and wall, engine boat but in-dept, radio, etc.) is 30 and poor (cottage, non-engine boat, no land) is 54%. There are only 3 primary schools with 8 classes, and Koh Toch village have no school for children. No health center in this areas, no doctors. There are 8 wells, but some are run out of water during dry season. No infrastructure: route, electricity, transportation, etc.

Men are the main actors in fishing, but most of the women are free and stay home during day time. The traditional roles in house-works, on rice field, in animal husbandry, in marketing and some time mend fishing tool. However, the women influence in decision making at both household and village levels are significant.

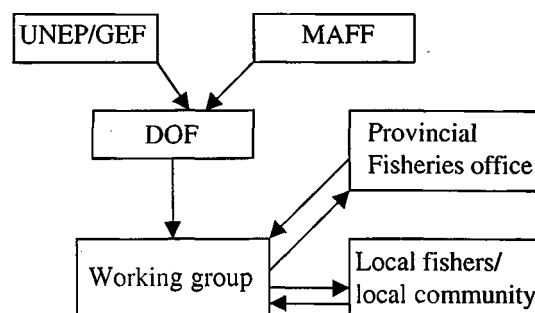
Problem and challenges faced by this community include minor internal fishing conflicts, large amount of external fishing conflicts, increase in number of fishermen, poverty and indeptness, passive attitude and lack of unified force (in particular, women and the poorest), lack of others skills in alternatives, no boundary delimitation of fishing grounds for community and the trawlers, lack of knowledge of habitat observation (coral reef, sea-grasses, mangrove and coordinate to protect endangered species (sea turtle, dugong) such lack of regular control of competent agencies over fishing abuses and poor responses from local authorities in the same regard.

3. Management authority

Management authority in the Koh Rong site had varied from regime to regime due to the civil war was toured in this country. In 1960s and 1970s, the site was managed or governed by two authorities Sihanoukville International Sea Port and the Navy. There are no people lived in Koh Rong site in Khmer Rouge period (1975-79). This site is under controlling by Pol Pot authority and there are no fishing activities. In 1979 to 200, Koh Rong site had governed by Navy authority of Cambodia Government for five miles around islands. Since 2000, Koh Rong site became a new district (Meattapeap district) in Sihnoukville and it had been managed by Sihnoukville governor cooperation with Navy authority.

The Department of Fisheries is the principle government agency responsible for management of living aquatic resource in the Marine Protected Area at Koh Rong Site. The working group (Unit) of DoF, will cooperated with local authority, commune, local fishers, NGOs and relevance institutions to manage and conserve the resources. At the future the Koh Rong site will employ some rangers, an admitrative assistant and a manager. The structure of Marine Protected Area in Koh Rong site was organized as below:

Flow chart of management structure for Marine Protected Areas



■ CONCLUSION

Through the review of the existing legislation, the law enforcement in coastal zone of Cambodia based on the infrastructure and development in coastline in order to promote standard of living for local people. It is quite lack of law enforcement in marine fisheries and other ecosystem. Under water resources, as coral reefs and seagrass is very little known as a nursing ground, sanctuaries and food for marine species.

The uses of fishing gears are rapid increasing year by year due to population are also increased. Therefore, management of fisheries activities in coastal zone area is more need and fisheries law (CHBAB 33 kra) should be updated to follow up the changing of real context.

Marine Protected Areas plays a very important role in order to save natural marine resources as well as using natural resource in sustainable. The community natural based management is one of the duties to restore and manage resources, and cooperation from relevance institutions and NGOs is necessary needed to strengthen and provide alternatives or experiences.

Table 1. The statistic of traps (Crap trap, Fish trap and squid trap) use in sea of Cambodia (Unit = Number)

Province/Municipality	1997	1998	1999	2000	2001
Kep	200	1,000	500	11,550	10,000
Kampot	2,303	1,745	1,745	1,745	6,175
Sihanoukville	1,620	1,420	2,300	2,080	2,080
Koh Kong	19,077	19,077	29,415	35,874	48,000
Total	23,200	23,242	33,960	51,249	66,255

Source: DOF 2002

Table 2. Data of mackerel gill net use in the coastal area of Cambodia (Unit = m)

Province/Municipality1	1997	1998	1999	2000	2001
Kep	-	-	-	-	-
Kampot	-	-	-	-	-
Sihanoukville	17,620	26,900	84,600	64,700	64,700
Koh Kong	113,600	113,600	113,600	113,600	-
Total	131,220	140,500	198,200	178,300	64,700

Source: DOF 2002

Table 3. Data of Scomberomorus gill net use in the coastal area of Cambodia (Unit = m)

Province/Municipality1	1997	1998	1999	2000	2001
Kep	-	-	-	-	-
Kampot	-	8,700	-	-	-
Sihanoukville	43,800	45,800	86,600	100,000	100,000
Koh Kong	23,000	30,500	53,500	48,000	84,000
Total	66,800	85,000	140,100	148,000	184,000

Source: DOF 2002

Table 4. Data of shrimp gill net or trammel net use in the coastal area of Cambodia (Unit = m)

Province/Municipality1	1997	1998	1999	2000	2001
Kep	300	1,000	1,000	2,000	1,200
Kampot	10,500	9,750	4,100	4,100	27,100
Sihanoukville	145,700	145,700	121,900	104,900	104,900
Koh Kong	312,600	312,600	869,055	542,890	190,000
Total	469,100	469,050	996,055	653,890	323,200

Source: DOF 2002

Table 5. Data of crab net use in Cambodian waters (Unit = m)

Province/Municipality1	1997	1998	1999	2000	2001
Kep	500	20,000	10,000	10,000	10,000
Kampot	10,900	24,200	40,755	27,600	27,600
Sihanoukville	87,500	87,500	219,500	204,000	225,000
Koh Kong	294,300	294,300	268,290	719,770	372,600
Total	393,200	426,000	538,545	961,370	635,200

Source: DOF 2002

Table 6. The statistic of Clupea gill net used in Cambodia sea (Unit = m)

Province/Municipality1	1997	1998	1999	2000	2001
Kep	-	-	-	2,500	-
Kampot	-	-	5,700	7,600	7,600
Sihanoukville	15,900	15,900	19,900	19,900	19,900
Koh Kong	8,000	8,000	8,000	8,000	-
Total	23,900	23,900	33,600	38,000	27,500

Source: DOF 2002

Table 7. Number of Villages and population in Koh Rong Site

No.	Village Name			Population	
	Koh Rong	Koh Rong Sanlem	No. of family	No. of People	No. of women
1	Koh Roch	-	90	329	203
2	Deam Tkov*	-	59	335	162
3	Prek svay	-	101	499	361
4	Sok San**	-	51	244	52
5	-	Koh Rong Sanlem	51	259	129
			352	1666	907

* Deam Tkov ville is the Commune Head Quarter of Kon Rong

** Sok San village is under registration

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