
FISHERIES MONITORING, CONTROL AND SURVEILLANCE IN CAMBODIA

Nao Thuok⁴, Long Korn⁵ and Taing Chenda⁶

Abstract

Fisheries in Cambodia, especially inland fisheries, play a very important role in the daily life and food security of the people, as well as strengthening the national economy. Cambodia is a fish eating community, where fish constitutes more than 75% of the animal protein intake, especially the among the rural poor.

The source of the fisheries richness comes from the underexploited marine fisheries of the Gulf of Thailand and the unique hydrological system of the Mekong river and the Tonle Sap Great Lake, which create a vast inland fisheries comprising numerous rivers and lakes, extended into flooded forests, grasslands, rice fields and swamps.

Since the French colonial time, fisheries management law and regulations have been promulgated aiming at protecting and conserving the natural resources for long-term sustainable use and for the generations to come. For this reason, law enforcement through MCS has been implemented for the sake of fisheries conservation.

During more than two decades of civil war and internal unrest, law enforcement through policing has been very difficult and virtually ineffective because of the lack of local participation. Fishers used to violate the fisheries law with impunity by arming themselves. Furthermore, many institutions have been involved in fisheries management, creating more problems to fishing communities than alleviating them.

As a consequence, the fisheries are now under threat of overexploitation as a result of poor management and the inefficiency of MCS. At the same time, the lack of resources allocated to the fisheries sector makes MCS and fisheries conservation more difficult.

The paper describes the actual situation of the fisheries sector and MCS, and recommends possible ways of improving important inspection practices with the participation of local fishers.

1. INTRODUCTION

Cambodia is a fish-eating community. Fisheries in the country, especially inland fisheries, play a very important role in the daily life and food security of the people, as well as in strengthening the national economy. More than 75% of the total animal protein intake of Cambodia's approximately 10.2 million people comes from fish (Ahmed, Tana and Thuok, 1996).

The source of the fisheries richness is two areas: the Cambodian underexploited marine fisheries, and the unique hydrological regime of the Mekong – Tonle Sap river system. The latter system creates a vast inland water fisheries, comprising numerous rivers and lakes, extended into flooded forest, grassland, rice fields and swamps, of which the Tonle Sap Great Lake is recognized internationally to be one the world's most productive freshwater lakes.

4. Deputy Director, Department of Fisheries, Phnom Penh

5. Chief of Inspection and Surveillance Office, Department of Fisheries, Phnom Penh

6. Chief of Siem Reap Provincial Fisheries, Phnom Penh

The fisheries resources have been exploited for at least 800 to 1000 years for local consumption, ever since the great Angkor era, as demonstrated by carving on the temple's wall (Tana, 1996). Chou Ta Kuan, a Chinese observer in the 13th century, also appreciated the fisheries resources richness of the Tonle Sap Great Lake and the prosperous life of the Angkorian peoples at that time (Siam Society, 1992). In the last century, fishery management was introduced by the French colonial regime to generate revenue for the government. Until today, most attention in management terms has been paid to MCS rather than community-based or co-management approaches.

1.1 Inland fisheries

Cambodia's extensive capture fisheries are carried out in the vast Tonle Sap Great Lake – Mekong River system.

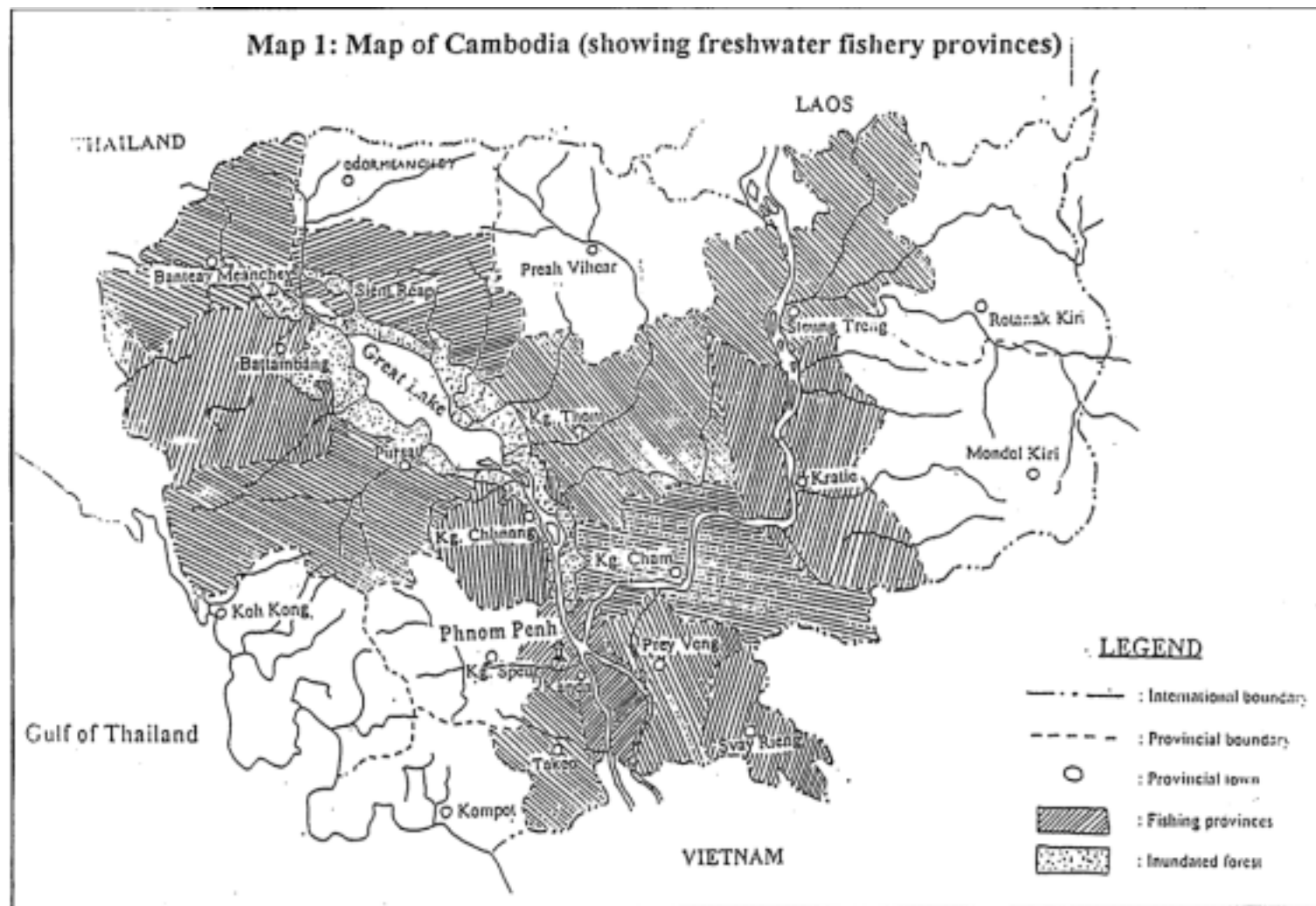
The Mekong river has its origin in Tibet and meets the Tonle Sap river at the "Four Arms," in front of the Royal Palace in Phnom Penh, after travelling about 350 km in Cambodia from the Lao border. It continues as the Mekong downstream and the Bassac rivers into southern Viet Nam. During the monsoon, the Mekong river feeds into the Great Lake, causing the flow of the Tonle Sap river to reverse.

The Tonle Sap Great Lake, occupying nearly 6% of the total land area of the country in the flood season, is the largest and most productive freshwater lake in Southeast Asia (Bardach, 1959). Located in the country's northwest plain, the lake covers about 3 000 km² during the dry season, with an average depth of 1 m. During the peak of the monsoon flood, the lake expands to about 15 000 km², with a depth varying from 11 to 14 m, and inundating some 10 000 km² of forest (Carbonel and Guscafre, 1963). The inundated forest area constitutes an enormous and effective fish breeding, nursing and feeding ground. Around 280 fish species utilize the flooded forest for at least 6 months for breeding, nursing and feeding during the monsoon (Thuok, Ahmed and Nouv, 1996). The magnitude of the Mekong flood has a high correlation with the volume of water flowing into the Tonle Sap Great Lake, the expansion of the lake water and the lake's fish production (Ahmed, Tana and Thuok, 1996).

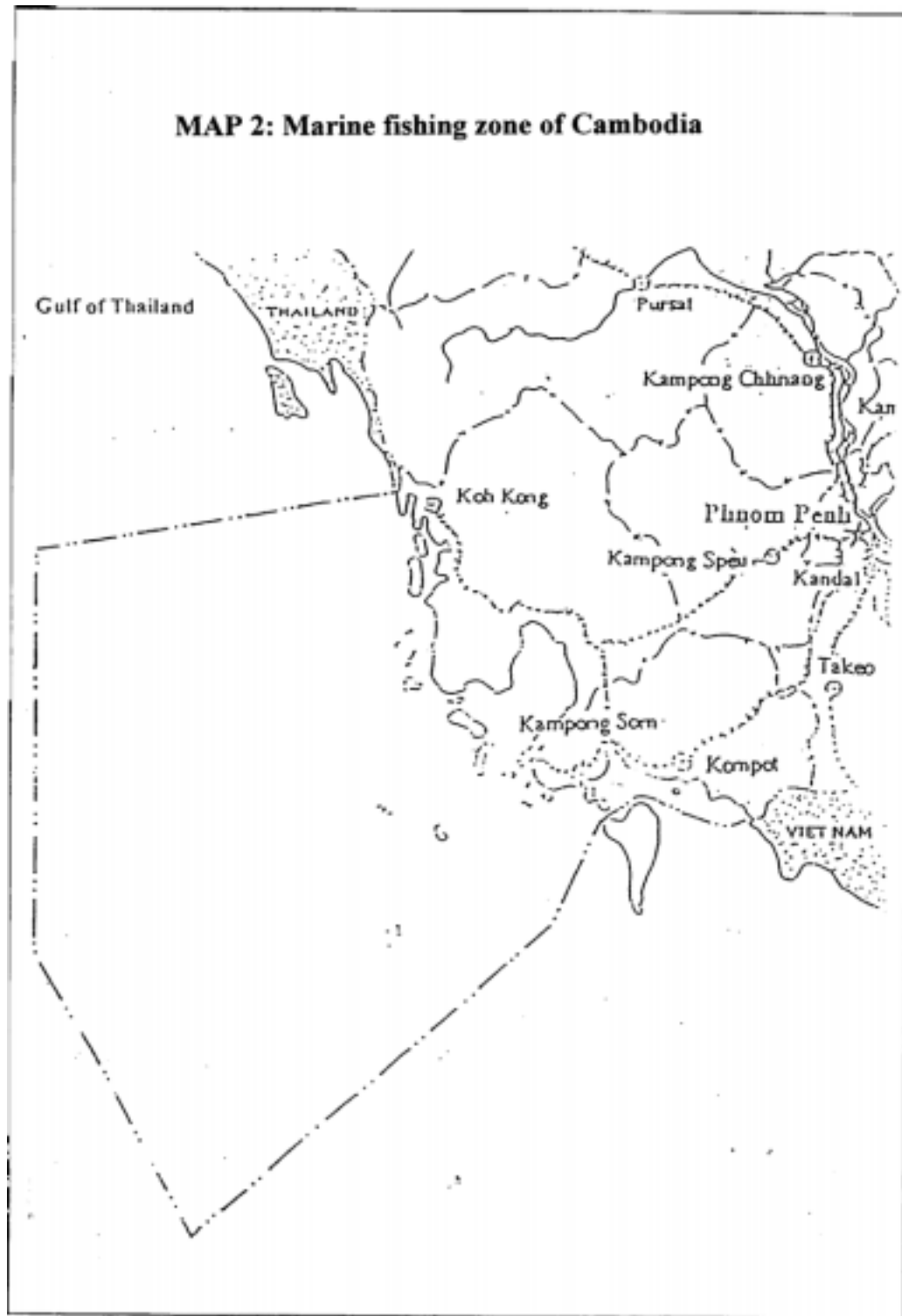
Thirteen of the 23 Cambodian provinces are considered fishing provinces (see Map 1) with various fishing grounds, of which six border the Great Lake (Kompong Thom, Siem Reap, Banteay Meanchey, Battambang, Pursat and Kompong Chhnang) with a population of nearly 3 million. Three provinces lie along the upper Mekong, namely Stung Treng, Kratie and Kompong Cham. The other fishing provinces (Phnom Penh Municipality, Kandal, Prey Veng, Svay Rieng and Takeo) lie along and within the floodplain of the Tonle Sap river, the Mekong downstream and the Bassac river. There are 170 fishing villages in the Great Lake area. The majority of villages are located along the Tonle Sap, the Mekong and the Bassac river. The number of fishers varies with the region and the fishing season.

Ebihara (1968) gave the following account of the fishing practices of the Cambodians:

“Every Cambodian farmer fishes to a limited extent in his paddies or nearby potholes of streams for family subsistence. Those who live along Lake Tonle Sap, along rivers, or on the coast may be exclusively fishermen, but these tend to be Vietnamese rather than Khmer. The total annual yield is quite large and is marketed fresh, fried, or as fish paste or oil; about one-third to one-quarter of the catch is exported.”



Country and regional papers presented at the Regional Workshop on Fisheries Monitoring, Control and Surveillance. Kuala Lumpur and Kuala Terengganu, Malaysia, 29 June - 3 July 1998



1.2 Marine fisheries

Cambodia is fortunately blessed with a coast line of 435 km lying along the four coastal provinces of Koh Kong, Sihanoukville (Kompong Som), Kampot and Kep Municipality. Cambodian marine fisheries cover an area of approximately 42 000 km² (approximately 23% of the total land area), including the EEZ (Map 2). The marine fisheries are still underdeveloped due to the lack of investment. The fishing operation is generally a one-day trip in shallow water of less than 20 m. There are about 40 fishing villages in the four coastal provinces, with about 10 500 fishers. The number of boats without engines and with engines are 580 and 3 560 respectively, ranging from less than 10 hp to more than 50 hp.

2. NATIONAL FISHERIES POLICY

Since 1979, after the collapse of the Khmer Rouge regime, the national fisheries policy has been to supply sufficient fish to all Cambodian people through sustainable exploitation of the natural resources to meet the need of the country and at the same time to protect and conserve the natural resources for sustainable use and for the generations to come.

In the First Socio-Economic Development Plan (1996-2000), it is anticipated that by 2000 production will be 68 000 t (about 4 500 t above 1996 catch) from inland capture fisheries, 35 000 t from marine fisheries (about 4 000 t above 1996 production) and 13 000 t from aquaculture (about 4 000 t above 1996 production). It is expected that 31 000 t out of the expected production could be exported (Department of Fisheries, 1995).

Until now, national fisheries policy has relied mainly on management of the natural fisheries to supply sufficient fish for the people and to serve the export markets, with promotion of marine and inland aquaculture production.

The national fisheries policy stated in the current First Socio-Economic Development Plan is:

- to improve fisheries production to supply sufficient foodstuff for home consumption and promote fishery export to contribute to the national budget; and
- to manage, conserve, protect and develop sustainably the fisheries resources.

3. FISH PRODUCTION

The country's total annual fish production is recorded by the Department of Fisheries (DOF) through data collected from provincial office reports (Table 1).

However, this figure covers only licensed medium- and large-scale commercial fisheries, and excludes small-scale, family fisheries, as well as unlicensed and illegal medium-scale fishing. It worth noting that the family fisheries are believed by many experts to be much more important than the commercial fisheries. The Director of Fisheries (Han, *pers. comm.* 1997) estimated that at least

Table 1 Fish production (tonnes) in Cambodia, 1990-1997

Year	Inland	Marine	Aquaculture	Total
1990	65 100	39 900	6 400	111 400
1991	74 700	36 400	6 700	117 800
1992	68 900	33 700	8 500	111 150
1993	67 900	33 100	7 400	108 900
1994	65 000	30 000	7 640	103 200
1995	72 500	30 500	8 779	112 510
1996	63 510	31 200	9 000	104 310
1997	73 000	29 800	11 483	114 283
Average	68 826	33 075	8 237	110 444
	62%	30%	8%	100%

Source: Department of Fisheries, 1998

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100 000 to 120 000 t of fish was produced by unlicensed medium-scale and family fisheries annually. Data collection has been prevented by a lack of qualified statistical staff and technical resources.

Recorded annual average freshwater fish production from 1990 to 1997 was 68 826 t (62% of the total catch), whereas the average annual marine catch was 33 075 t (30%). Aquaculture contributed about 8% to fish production.

According to the result of the catch assessment and socio-economic survey of the MRC/DOF/Danida Project for the *Management of the Freshwater Capture Fisheries of Cambodia*, the overall catch estimate should be four to five times as much. The project has set up a catch assessment study based on stratified random sampling of the catch (by species and gear) and frame survey information on fishing gears (van Zalinge *et al.*, 1996; Diep, Sina and van Zalinge, 1998). Their data for the annual inland water catch in the period 1994-1997 are summarized in Table 2.

Table 2 Estimated range of the inland water catch (tonnes) in Cambodia, 1994-97

Category	Annual catch range ⁽¹⁾ (t)	
Large-scale fishing lots	30 000	60 000
bag nets (<i>dais</i>) ⁽²⁾	15 000	20 000
Medium-scale ⁽³⁾	60 000	75 000
Family fishers ⁽³⁾	100 000	125 000
Rice field fisheries ⁽⁴⁾	50 000	100 000
Total	255 000	380 000

Notes: (1) Range reflects uncertainty in actual catch levels.

(2) Approximate minimum and maximum values in 1999/95 season. (3) Based on socio-economic data extrapolated to whole country. (4) based on ca. 2 million ha × likely range of fish yields (25-50 kg/ha).

Source: Diep, Sina and van Zalinge, 1998.

4. FISHERIES MANAGEMENT LAW AND REGULATION

4.1 Background

Fishery management in Cambodia has evolved since the early 1900s during the French colonial time. There was a really extensive and complete *Code of Fisheries* when the then government under the French protectorate began demarcating good fishing grounds as "fishing lots" for private exploitation, from 1901 to 1929, through a bidding system (Tana, 1996).

The *Fisheries Law*, enacted in 1987, comprises 6 chapters and 44 articles based mostly on the prewar *Code of Fisheries* introduced in the French colonial period in the 1940s. The law and subsequent regulations focus mainly on fisheries conservation and sustainable use of the resource.

4.2 Fishing season

The fishing season is defined clearly by the fisheries law: from October to the following May for the region north of the "Four Arms" parallel, and from November to the following June for the area south. The closed season from June to October to allow fish spawning is declared officially every year. A closed season is also applied from 15 February to 15 April to marine fisheries in the area less than 20 m deep, to protect fish spawning. For fish size selection reasons, the mesh size of net and bamboo fences must be at least 15 mm in both freshwater and marine fisheries. However, the present fisheries law does not consider the socio-economic conditions of fishers' communities living in floating villages.

4.3 Fishing practices

Fishing in Cambodia is classified into three levels according to the length and width of gears:

- Small-scale, family fishing is subsistence fishing for family consumption, using small gears, such as gill nets less than 10 m long; single-hooked line; small traps of less than 0.3 m diameter; etc. This kind of fishing needs only family labour and is aimed only at household consumption, not for commercial purposes. This kind of fishing can take place year round everywhere, except in the fishing lots, which are exclusive concessions and auctioned for large-scale fishing.
- Medium-scale fishing is all kinds of licensed mobile fishing, which covers most fishing practices and widespread in fishing communities for commercial purposes, using larger gears, with some hired labour from the community. It can be operated only in open waters outside the fishing concessions and during the fishing seasons as defined under the fisheries law.
- Large-scale fishing is the operation of fishing lots, barrage fishing and bag net fishing (*Dai*), rights to which are auctioned for a two-year lease term to private individuals or companies. This kind of fishing requires a large amount of investment, labour (80-120 persons hired from neighbouring communities) and can be operated only in accordance with the burden book issued by DOF.

5. FISHERIES MCS

5.1 Organization of fisheries MCS

Fisheries management in Cambodia is the responsibility of DOF, Ministry of Agriculture, Forestry and Fisheries. DOF is divided into eight offices, one of which – the Inspection and Surveillance Office – is responsible for fisheries MCS (Figure 1).

The DOF is headed by a Director, assisted by 3 deputies. The Director is responsible for MCS in the inland and marine fisheries. When needed, a Deputy-Director is assigned temporarily to be responsible for this duty.

The Inspection and Surveillance Office has four subdivisions: one for marine fisheries inspection and three for freshwater inspections.

5.1.1 Marine fisheries inspection

The marine inspection station in Kompong Som (Sihanoukville) is responsible for MCS in the four coastal provinces of Koh Kong, Kampot, Sihanoukville and Kep. It has three patrol boats and 58 staff. The boats are obsolescent and very often cannot go out patrolling.

5.1.2 Freshwater fisheries inspections

Freshwater fishery inspection is subdivided into three units to match geographical characteristics, namely Great Lake inspectorate, Mekong inspectorate and Chaktomuk inspectorate, but the inspectorates are ill-equipped: 20 to 30 staff in each unit, with one to two locally-made, powered boats.

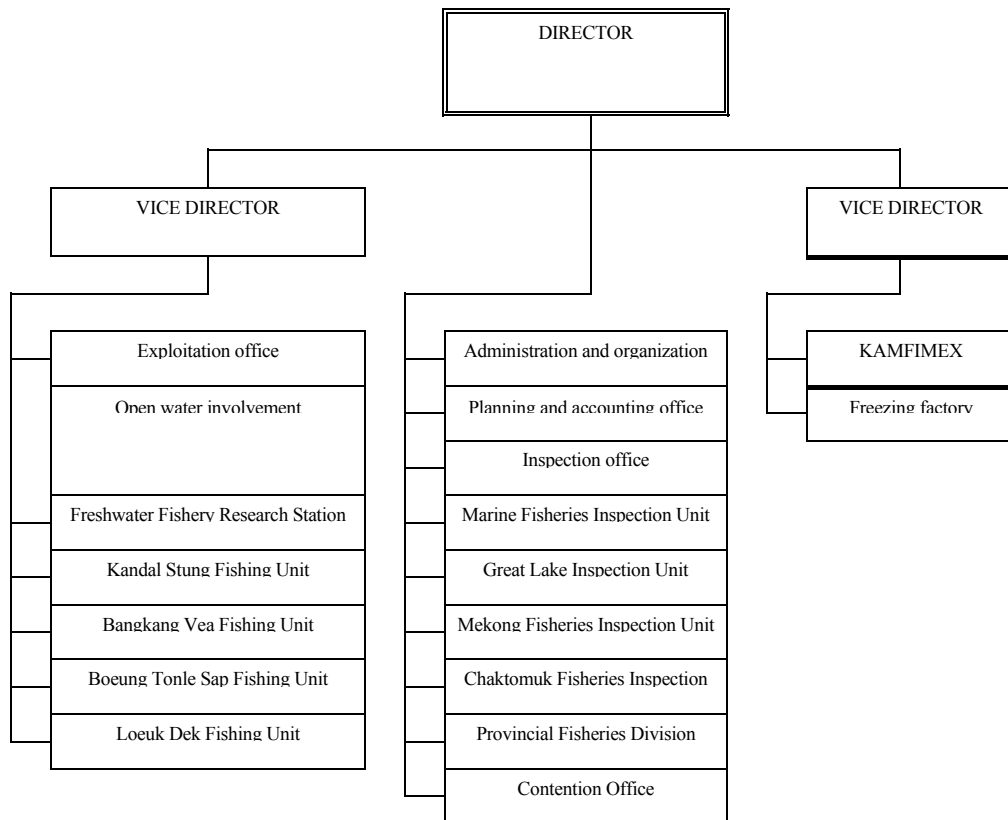


Figure 1 Organizational structure of the Department of Fisheries, Cambodia

5.1.3 Provincial fishery inspections

In addition to the DOF fishery inspections, each fishery province has organized its own provincial inspection, comprising 7 to 10 officers with duties matching the DOF's inspectorate. These units control only the fishing activities at communal level within the relevant province.

As the Provincial Offices of Fisheries come under the various Provincial Departments of Agriculture, MCS differs from one province to another. This discrepancy creates difficulties for DoF in coordination and enforcement of fisheries law.

5.1.4 Collaboration

MCS activities carried out regularly by the different levels in the same area need coordination to ensure that no duplication occurs and that the MCS activities reinforce each other efficiently. In 1998, at the end of the fishing season, a Fishery Surveillance Committee – with the participation of military and local fishers – was created to deal with illegal fishing, especially brush park fishing (known locally as *samras*) in the Tonle Sap Great Lake. The result shows that this kind of collaboration is very efficient and can protect the fish broodstocks from being overexploited.

6. CONSTRAINTS IN FISHERIES MCS

MCS of Cambodian marine and freshwater fisheries is an extremely difficult task due to more than two decades of war and concomitant anarchy. At the same time, many institutions have been involved in the management of the sector, legally and abusively, making it difficult for fisheries planners and managers to perform well their tasks and to better arrange community participation. Because local fishers are first and foremost the immediate beneficiaries of the fisheries resources, the participation of the local communities in planning, implementing, monitoring and evaluation is an absolute necessity in order to better strengthen MCS activities. The major constraints in fishery MCS are considered in the following sections.

6.1 Lack of qualified and skilled staff

As a result of the Khmer Rouge genocidal regime, the lack of sufficient and qualified fisheries professionals to conduct research and to manage properly the resource is one of the main constraints in fishery MCS. Most of the senior and qualified people were killed or fled the country. More than 55% of DOF staff have no training in any field of fisheries. Staff working in MCS are ill-aware of new and improved management skills.

6.2 Budgetary limitations for equipment and materials

Budget limitations are a major constraint in MCS operation, as the government still faces a financial deficit in its budgetary balance. Equipment and materials – especially patrol boats – are obsolete and poorly equipped. Fishers are better equipped than the fishery MCS units. Low wages are a major obstacle to conservation efforts because the current salary is extremely low and does not reflect the cost of living.

The lack of well-equipped patrol boats hampers MCS efforts as fishers are very well equipped. This also limits the capacity for patrols in the EEZ and allows more opportunities for foreign boats to poach in Cambodian territorial waters.

6.3 Open access nature of the fisheries

Most of the fisheries are open access in nature, thus attracting the landless, displaced people to earn their living from them. The year-round open access nature of fisheries for small-scale fishing complicates MCS activities as it is very difficult to clearly separate small-scale from medium-scale in practice.

6.4 Lack of community participation in fishery conservation, protection and management

The lack of cooperation with other stakeholders and the lack of community participation in resource conservation and management are major issues for future fishery management as the DOF cannot succeed in isolation without the commitment and involvement of local communities. Law enforcement through policing has alienated local fishers from cooperating with the regulatory regime.

7. NATIONAL PRIORITIES FOR FISHERIES MCS

Given various users and use conflicts, it is impossible for the government to protect fisheries, forestry and wildlife resources solely by means of policing, i.e., relying on control and enforcement. A socially equitable fishing rights policy is a precondition for any improvement in the management framework. The communities deserve to be involved in the management of the resources they rely on (Ahmed and Tana, 1996). The following recommendations are made for better fisheries MCS:

- *Institutional strengthening*: Overall capacity needs strengthening, especially in the field of MCS, to enable inspection units to perform well their assigned MCS activities.
- *Community awareness and participation*: Community participation is a precondition for MCS because the community comprises the direct users, who live within the resource day and night and who benefit directly from the participation. Community awareness should be built up extensively throughout the fishing population.
- *Extension of institutional responsibilities*: The responsibility of DOF and other institutions should be clearly understood by fishers and other stakeholders so that each institution can perform well their duty without duplication.
- *Community-based coastal and inland fisheries management*: Local authorities and fishers communities are potential partners in fisheries co-management. Some power and responsibilities should be delegated to the local people. Mangrove and flooded forest protection, conservation and reforestation campaigns should also be implemented through community-based management by involving local authorities and communities in decision making, planning, implementing and monitoring and evaluation.

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