

CAMBODIA

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INTRODUCTION

Cambodia's fisheries sector encompasses extensive freshwater fisheries within floodplains, river and lakes; marine fisheries; rice field fishery and some aquaculture. Department of Fisheries (DOF) of the Ministry of Agriculture, Forestry and Fisheries is the competent agency responsible to manage all marine fisheries and inland water in the country, including mangrove forests.

The freshwater capture fisheries contribute more to national food security and economy than other fishery resources in Cambodia. The annual catch ranges between 290,000 - 430,000 tonnes (Table 1), which is the fourth largest in the world. Cambodia has a wide range of freshwater species. It has been reported that approximately 500 species are likely to be found in the Cambodian Mekong and Tonle Sap-Great Lake.

In 1960s the Cambodia's annual marine catch was around 40,000 tonnes. A Cambodia/ USSR study in 1980s reported that around 435 fish species from over 97 families were found in Cambodia marine water, with a total stock of around 50,000 tonnes/ year. Mackerel, Scad, Anchovy, Sardine, Tuna and Pomfret were identified as the most commercially

important pelagic fish species and Threadfin Bream, Croaker Big-Eyes, Lizard Hair-tail fish, Flat fish, Snapper, Barracuda, Grouper, Shark and Conger eel as the most important demersal fish species. Seven shrimp species, one squid species, and two cuttlefish species with a stock of about 1,300 tonnes/ year were also identified. By early 1980s the production has fallen drastically due to a number of interrelated factors, including decrease of population in urban areas, thus reducing private sector production and marketing arrangement. In 2002, the marine fisheries catch was 45,000 tonnes (Table 1).

Cambodia's aquaculture development, particularly small-scale aquaculture, is significant. Its production has increased from 1,600 tonnes in 1984 to 18,000 tonnes in 2002. Cage and pen culture production contribute more than 70% of the total aquaculture. The major cultured species in cage and pen system are *Pangasius hypophthalmus* (73%) followed by *Channa micropeltes* (21%). Other species cultured include *Puntius sp.*, *Clarias batrachus*, *Oxyeleotris marmorata*, *Cirrhinus sp.*, *Puntius altus* and *Leptobarbus hoevenii* which fishermen used to stock for a couple of months for fattening during abundant catches and sell it when fish were scarce.

Table 1. Cambodia's annual fish catch

Type of fishery in Cambodia	Catch from 1994-2002
	<u>Annual catch range (tonnes)</u>
<ul style="list-style-type: none"> • Large scale fisheries <ul style="list-style-type: none"> - Fishing lots ¹ - Dai (bag nets)² • Middle scale fisheries³ • Family fisheries³ • Rice field fisheries⁴ 	30,000 - 60,000 15,000 - 20,000 85,000- 100,000 115,00 - 140,000 45,000 - 110,000
Total Inland Fish Catch	290,000 - 430,000
Including marine fisheries productions = 45,000 t	335,000 - 475,000
Including aquaculture productions = 18,000 t	353,000 – 493,000

Source: DOF (1999/2002); Deap et al.(1998); and Ahmed et al. (1998)

¹Range reflects uncertainty in actual catch levels.

²Range shows approx. minimum and maximum value in 1994-1998.

³Based on socio-economic survey data extrapolated to entire country.

⁴Approx. 1.8 million ha (rice fields) x likely range of fish yields: 25-62 kg/ha.

Fish contributes to 75% of the total animal protein intake of the population. A well- managed fisheries sector is essential for the Royal Government of Cambodia (RGC) to meet its key goals of food security, poverty alleviation and national revenue generation in

the country. The monetary value of both marine and aquaculture production is around US\$ 250-300 million, which is approximately 8 - 10% of the total national GDP of US\$ 2,800 million.

FISH PROCESSING INDUSTRY

Though fresh fish is much preferred in Cambodia, a significant proportion of fish is processed for human and animal consumption. Most processed fish product is consumed domestically. A proportion of higher-quality, higher-value product is exported, mainly to Southeast Asia. The main species processed are freshwater and marine fish (dried, iced and frozen), followed by squid, octopus and beche-de-mer (FAO, 1993). FAO (1991) reported that about 60% of total fish were consumed fresh, 18% were fermented, 13% salted-dried, 5% smoked, 2% fish sauce and 2% other derived products.

Most of the fish are processed traditionally, e.g. sun-dried, salted-dried, smoked and steamed. The most significant traditional fish products are fermented fish and fish sauce. Traditional processing method utilizes a high volume of small fish (from inland fishery) and trash fish (from marine fishery) for human and animal consumption. The volume of processed fish for both local consumption and export can be seen in Table 2.

Table 2. Volume of processed freshwater and marine fish in Cambodia, 2001

Product	Local consumption (tonnes)	%	Export (tonnes)	%	Total production (tonnes)
Dried finfish	3,032	57.80	2,214	42.20	5,246
Dried shrimp	277	66.11	142	33.89	419
Dried squid/octopus	25	3.37	717	96.63	742
Smoked finfish	512	65.06	275	34.94	787
Steamed finfish	458	100.00	0	0.00	458
Fermented finfish	1,257	43.83	1,611	56.17	2,868
Paste	7,187	56.68	5,494	43.32	12,681
Crabmeat/ shrimp	652	99.54	3	0.46	655
Iced finfish	0	0.00	4,941	100.00	4,941
Frozen finfish	0	0.00	230	100.00	230
Frozen shrimp/ crab	0	0.00	1,676	100.00	1,676
Frozen squid/ octopus	0	0.00	25	100.00	25
Dried trash fish (fish feed)	1,492	65.04	802	34.96	2,294
Fish meal (fish feed)	740	98.67	10	1.33	750
Total	15,632	46.29	18,140	53.71	33,772
Fish sauce (litre)	3,414,000	100.00	0	0.00	3,414,000

Source: Department of Fisheries Statistics (2002)

Freshwater and marine fish are processed by traditional and modern technology. Most of the traditionally processed fish are consumed

domestically, whereas the modern processed fish products are supplied for both domestic and export markets.

Traditional processing technology

The fisheries commodity produced by this traditional processing technology are normally supplied to domestic market, including those who are living within the country as well as outside the country. The traditional fish processing establishments are classified to small, medium and large scale.

Small-scale

The products processed in small-scale processing establishments include fish paste, fermented fish, fish sauce, sun-dried and salted-dried fish, smoked fish, and steamed fish. Small-scale processing establishments are generally household-based. The products are low-value and intended for family consumption.

Medium-scale

Like small-scale processing establishment, medium-scale establishments are also household-based, whose workers are generally household members, their relatives, and hired labours, particularly during peak period. The products are sun-dried and salted-dried, smoked, fermented and pasted fish. Sun-dried trash fish is exported to Vietnam. The fish products processed by medium-scale traditional establishments generally have lower value than those processed by large-scale establishments.

Large-scale

Large-scale processing establishments are generally located in fishing villages or nearby fishing lots. The number of workers ranges between 40 - 60, most of them are women. They are employed during peak season of fish catch from January-February to May-June. The products processed include salted-

dried fish, ordinary fish paste and high-value boneless fish paste. Thousand of tonnes of these products are annually produced from Tonle Sap-Great Lake, where fish are caught by middle scale and large-scale fishers. Fish sauce manufacturing is also part of large-scale processing establishments, providing jobs for about dozen of men in each enterprise.

Modern processing technology

In general, these fish products are produced for export to the international markets. The modern-processing establishments are run by local private companies and foreign-based companies. They are operated under supervision of the Department of Fisheries. There are three freezing plants in Cambodia, and these plants have export permits issued by Department of Fisheries. One plant is located in Phnom Penh and the other two in Sihanoukville.

Lian Heng Trading Company

This company has two processing plants, one in Phnom Penh and one in Sihanoukville.

1) Processing plant in Phnom Penh

It produces processed freshwater fish products intended for export to:

- US/Australia: Frozen fish and shrimp and smoked and salted-dried fish
- Singapore: Frozen freshwater fish.

In 2001, the plant exported 350 tonnes of processed fish products to the above countries, worth around US\$ 700,000. The company is unable to export to the EU yet.

2) Processing plant in Sihanoukville

The main investors of this company are Hong Kong and Taiwan-based companies. In 2001, the plant exported 300 tonnes product, worth US\$ 900,000. All products were exported to two respective buyers in Hong Kong and Taiwan. They were frozen shrimp, frozen squid, and stuffed crabmeat.

Sun Wah Fisheries Co., Ltd. (in Sihanoukville)

Established in Aug 1996, this company's major investor is a large Hong Kong company called SUN WAH. It is a medium-scale operation with a daily capacity of 10 tonnes of raw materials.

In 2002, the plant exported over 450 tonnes of processed fishery products mainly to its parent company in Hong Kong. Some products were then re-exported to other international destination markets.

SUN WAH is the highest quality seafood processing plant in Cambodia. This company has been authorized from the top government management to run the business successfully in Cambodia.

Marketing and distribution of fish products

The distribution and marketing of fish products are done by private sector. The marketing and distribution networks of freshwater fish and fish products are well developed, unlike its marine counterpart. A wide range of freshwater and marine fisheries products

is exported regularly. There is, however, no reliable correspondent data for value of production, value of export or destination of export. These issues should be addressed as a matter of urgency in the context of strengthening fisheries/aquaculture data collection.

Domestic markets

There is high demand for fish and fish products in the domestic market (Table 2). The most important products marketed and distributed are freshwater finfish and their traditionally processed derivatives. A small quantity of freshwater shrimps and bivalves are also sold. In marine areas many residents are self-sufficient, in term of fish production. High value species are usually sold to traders in Phnom Penh for export. Only 20-40% of the total small-scale freshwater aquaculture production (Tilapia, Common Carp, Chinese Carps, and Indian Carps) is sold directly at farm for local consumption.

The domestic market for marine products is relatively small. Consumption of marine species by Cambodians is generally restricted to marine areas.

The freshwater fish products are distributed in a few different ways. In many locations around the Great Lake and along river systems, fish are sold to consumers at the 'farm gate'. This method is especially applicable for small-scale processors of traditional products who target for domestic sale. In other cases, fish is transported by ox-cart, motorbike and small trucks to urban markets. In addition, cages are towed to Phnom Penh from the Great Lake region, hence fish distribution systems decline with increasing distance from the inland water.

In the marketing system for the freshwater fisheries, the main persons involved are fishermen, wholesalers/ middlemen and retailers.

- The fishermen are the workers that do fishing, either in small, medium or large scale
- The wholesalers/ middlemen are the marketers and providers who lend capital to most of the fishermen to buy and collect fish from small, medium and large-scale fishing operators, and then they sell fish to retailer
- The retailers are those that sell fish directly to the consumers

The place for fish landing, selling, and the key contacted place between lot owners, fishermen, middlemen and buyers are called the landing place. Generally, both fishermen and all types of buyers gather here.

The domestic distribution of marine species is poorly developed, and is limited to fresh or frozen high-valued species (e.g. shrimp, seabass, grouper and bech-de-mer). The marketing and distribution are primarily restricted to Phnom Penh.

Export markets

Around 24,150 tonnes of freshwater and marine fish (Table 3) and 18,140 tonnes of fishery products (Table 2) were exported in 2001. Table 3 listed the species exported and their export volumes.

The actual exports can be higher than the listed figures as collusion is a common practice at the border of Cambodia-Thailand/ Vietnam. For instance, freshwater fish and fishery products collected from Battambang, Siem Reap, Pursat, Kampong Thom and Kampong Chhnang provinces have been exported to Thailand, while reported to be collected from Kampong Cham, Kandal, Takeo, Prey Veng provinces, Phnom Penh and Vietnam. A substantial quantity of marine fish and fishery products, mainly high-value finfish, shrimp, and cephalopods that is exported to Thailand and Vietnam is possibly underestimated.

The main export destinations of fish and fishery products are Thailand and Vietnam. Others are Asian markets, such as Singapore, Malaysia, Hong Kong, China, Japan, and USA and Australia (Table 4). Cambodia has yet to have the European Union Commission's approval to export fish and fishery products to the EU markets.

Table 3. Volume and species of fresh inland and marine fish exported (DOF, 2001)

No	Common Name	Scientific Name	Cambodian Name	Volume (tonnes)
1.	Sand gobi	<i>Oxyeleotris marmoratus</i>	Trey Domrey	384
2.	Oriental flat head lobster/ Matis shrimp	<i>Thenus orientalis/ Oratosquilla nepa</i>	Bangkang Pak/ Bangkang Kandobses	69
3.	Pomfret	<i>Formio nigo/ Parastromateus nigo</i>	Trey Chap	10
4.	Grouper	<i>Serranidae</i>	Trey Teker	66
5.	Snakehead	<i>Channa micropeltes/ striatus</i>	Trey Ros/ Chdor	3,778
6.	Clariid catfish	<i>Clarias macrocephalus/ batrachus</i>	Trey Andeng	NA
7.	Soldier river barb	<i>Cyclocheilichthys enoplos</i>	Trey Chkaok	NA
8.	Black Ear catfish/ Pangasiid catfish	<i>Pangasius larnaudi/ Pangasius hypophthalmus/bocourti</i>	Trey Po/ Trey Pra	230
9.	Frog	-	Kangkeb	15
10.	Tiger shrimp	<i>P. monodom</i>	Bangkear Khlar	260
11.	Freshwater eels	<i>Honopterus albus</i>	Antong Teksap	43
12.	Mud crab	<i>Scylla serrata</i>	Kdam Thmor Khieu	49
13.	Water Snake	-	Pours Tek	19
14.	Snail, clam, blood cockles	<i>Mollusks</i>	Khayomg, Leas, Khchao, Kreng Cheam	NA
15.	Freshwater hard/ soft-shelled turtle	-	Andak/kantheay	12
16.	Asian bony tongue/ Boxfishes	<i>Ostracronidae</i>	Trey Tapot	NA
17.	Great white sheatfish	<i>Wallagonia attu</i>	Trey Sanday	26
18.	Featherback	<i>Chitala lopus</i>	Trey Kray	409
19.		-	Trey Khaya	11
20.		<i>Notopterus notopterus</i>	Trey Slart	25
21.	White lady carp	<i>Thynnichthys thynnoides</i>	Trey Linh	150
23.	Peacock eel	<i>Macrognathus siamensis</i>	Trey Chlonh	10
24.	Sheatfish	<i>Micronema</i>	Trey Kes	9,796
25.	Baby crocodile		Koun Krapeur	25,000*
26.	Ornamental fish		Trey Lum Or	NA
27.	Other species			8,788
	Total			24,150

Source: DOF Fisheries Statistic (2001)

* Exported to Thailand, China and Vietnam

Table 4. Imports of fisheries and fishery products from Cambodia into selected markets, 1998 - 2001

Importing country	Quantity (tonnes)	Value (US\$)
Hong Kong (1999)	648	6,137,820
Malaysia (1998)	173	2,632,849
Vietnam (2001)	233	188,889
Thailand (1999)	3,342	1,224,989
US (1999)	280	1,063,464
Singapore (1999)	108	1,000
China (2001)	153	962,305

Source: INFOFISH/ Cambodian DOF Fisheries Statistics (1999-2001)

STATUS OF HACCP IMPLEMENTATION

The HACCP implementation in fish processing industry in Cambodia is relatively slow. DOF is still in the process of preparing HACCP regulations. The implementation of HACCP in the fish processing industry in Cambodia is currently on a voluntary basis. No HACCP has been widely introduced into fish processing industry yet.

One export-oriented plant (Lian Heng) applied for HACCP for export-purpose to US in 1996. The FDA

approved and agreed in 1998 to allow the fish products to be exported to the US after a group of experts from the US made a direct observation to the plant site and recommended what should be done to meet the requirements of HACCP.

Regarding to EU market, Department of Fisheries of Cambodia is now under the process of drafting processing regulations to meet the EU's requirements.

DIFFICULTIES ENCOUNTERED

The difficulties in implementing HACCP are as follow:

- Lack of HACCP knowledge as well as technical knowledge on food safety hazards and their control

- Lack of understanding in HACCP implementation
- Inadequate number of qualified personnel
- No proper laboratory available
- Legislation is not strong enough to enforce HACCP implementation

STRATEGIES AND POLICY FOR IMPROVING HACCP IMPLEMENTATION

- Training on HACCP plan development for small-scale, middle-scale and large scale processors and stakeholders
- Training of personnel in the industry, government and academia in HACCP principles and applications, and increasing awareness of consumers
- Training on internal audit of HACCP programs
- Training on rapid tests/assessment of hazards
- Developing specific training to support a HACCP plan, working instructions and procedures
- Developing cooperation among primary producers, industry, trade groups, consumer organizations and responsible authorities
- Maintaining an effective plant hygiene and sanitation program
- Study tours, fellowships, exchange visits
- Joint training and control authorities to encourage and maintain a continuous dialogue and create a climate of understanding in the practical application of HACCP

CONCLUSIONS

In order to export the fish products to overseas markets, especially EU, food safety and quality assurance are very important. The DOF is encouraging the application of HACCP system in fish processing

plants, both small to medium scale and large scale. However, DOF would need to set up inspection facilities and to establish regulations for application of HACCP, GMP and SSOP in processing plants.