



## Fish Trade on Fishing Products in Tonle Sap Great Lake

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**Abstract** Looking to daily activities in Tonle Sap Great Lake and fish markets, the topic “Fish Trade on Fishing Products in Tonle Sap Great Lake” has been conducted to where fish products in Tonle Sap are exported, as well as of the way of fish processing. The study aims to (1) Identify the distribution of fish yields for domestic markets and fish species for processing; (2) Identify the distribution of fish yields for processing and different types of processing to domestic markets; (3) Evaluate the supply of the fresh fish yields in Tonle Sap to satisfy the demand of people in Cambodia; (4) Study market channels and values added by each transaction on fresh and processed fish products into domestic markets. Informally purposive sampling is selected for the research. The analysis shows the fish yields vary from each year in which the data has been recorded by the Fisheries Administration. However, during 2010, Tonle Sap Authority data shows the fish yield is about 537,000 tons, nearly triple of that of the Fisheries Administration of about 173,450 tons and equal to about 50% of Cambodian fish consumption. There are many fish species involved in the trade both domestic and international market such as bronze featherback, chevron snakehead, boeseman croaker, asian bonytongue, clown featherback, silver barb, giant snakehead, reddish sheatfish, frecklefin eel, blackspotted catfish, sickle fin barb, giant barb, peacock eel. The main actors of the supply chain of fisheries products are the fishing lot owners, fishers, fish collectors, wholesalers, trader-middleperson, and retailers. So, the fish market channel is from the first fishers until the final consumers. Fish market transaction is added from a transaction to another about 30% to over 80%, and the fish prices among domestic markets are not quite different from each other, just below 1,000 riel.

**Keywords** Tonle Sap Great Lake, fisheries product, fish trade, domestic fish products

## INTRODUCTION

Currently, Tonle Sap Great Lake is a stock pool for many fish species and is one of the great lakes in South-East Asia, and is generally mentioned as the heart of Cambodia, which is illustrating the society, the economy, the environment, and the culture. In fact, this lake is not just a unique ecosystem of inundated flooded forest, fish habitats, and subsistence for agriculture; it is also a vital part of historical and cultural heritage of Cambodia’s national identity (Campbell et al., 2006). It was a natural pool absorbing roughly 20% of the water flow from Mekong River and rich of the natural resources. Nearly half a million people are currently surviving and depending on the lake. Most people work as fisherman; some people plant crops, vegetables, rice, and other agricultural products. Various things to be considered were that fish supply would not be sufficient for current demands and for next generations. The main reason for the decline of all freshwater species was overexploitation and deforestation. The decrease of the natural resources and the rapid increases in the population had already resulted in the decrease of living standard throughout the lake area, as well as the entire country. Freshwater fish was further one of the most trading commodities in which the sellers sold them fresh in containers, fresh on ice, or in a wide variety of processing products. There were many steps and buying competitions involved in fish markets including the storage, handling, shipment, sale bargain, and product quality. Middlemen came and bought the fishing products from Tonle Sap Great Lake; then sold them by adding prices to the next buyers.

There were two main markets for fish products. Most of the exporters traded fish both fresh and processing products to the domestic markets in Phnom Penh, and also to foreign markets.

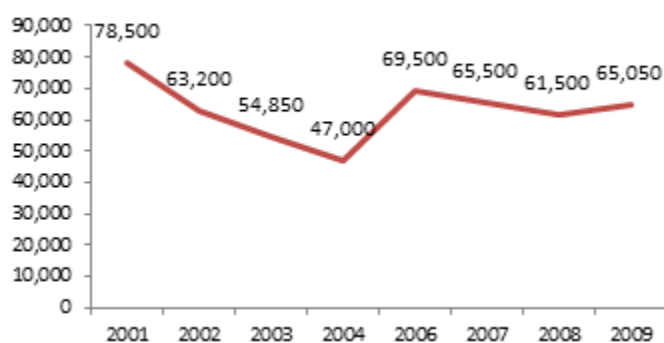
## METHODOLOGY

The study collected the annual fish yield to estimate the fish products in 2009 only. Three main markets, Chong Koh, Kampong Luong, and Chong Kneas (Tonle Sap Great Lake) were chosen to study about fish market channels and fish prices. The study continued to ask for more information of fish prices from fishers, middlemen, retailers, and other key informants. Moreover, three more main domestic markets in Phnom Penh: Orussey Market, Chbar Ampov Market, and Doeumkor Market, were studied for the final fish prices. Three main methods were used to collect data from fishers and other key informants such as observation, semi-structure interview, and in-depth interview. The purposively selective sampling method was the main for accomplishing the study. The information was collected from the fishers about fish species and their prices. After that, the study continued to stock-wholesalers and retailers in domestic markets. Using prepared questionnaires, nearly 114 semi-structured interviews were carried out with fishers (60), traders or distributors (30), fish processors (21), and government officials (3) for three selected provinces in Tonle Sap Great Lake during the prohibited fishing season. There were three main markets in Phnom Penh and a fish distribution in Chrang Chamres Fish Distribution Center. The 91-prepared questionnaires were asked for the fresh and processed fish prices and fish species at Doeumkor market 20 out of 40 fresh fish retailers and 07 out of 15 processed fish sellers, at Orussey market 20 out of 25 fresh fish retailers and 07 out of 20 processed fish sellers, at Chbar Ampov market 20 out of 40 fresh fish retailers and 07 out of 20 processed fish sellers, and at Chrang Chamres Fish Distribution Center 10 out of 19 distributors.

## RESULTS AND DISCUSSION

### Identification of fish distribution

Tonle Sap Great Lake looks like the pool for many fish species. According to FiA (2009), freshwater fish exploitation in 2009 was 390,000 tons in total. The exploitation from fishing lots and middle-scale fishing was about 120,000 tons while the small-scale fishing was roughly 155,000 tons. The data of rice-field fishing around 115,000 tons was also included. However, the study was focused mostly on the 06-provinces adjoining to Tonle Sap Great Lake, so the total amount of industrial and middle-scale fishing products is 65,050 tons. TSA (2010) showed that the area in Tonle Sap Great Lake was around 1,500,000 hectares during the rainy season but in the drought period, it would recede to 250,000 hectares.



**Fig. 1 Total catch of industrial and middle-scale fishing products (2001-2009)**

In Table 1, the study focused on the catchment of fishing products in six provinces in cooperation with FiA (2009) and TSA (2009). There are three main parts to be considered: industrial and medium-scale fishing products (IFMSF), small scale fishing products (SSF), and small scale fishing in the rice field (SSFiR). The data of TSA (2009) was used for the study.

**Table 1 Annual freshwater fish catch (Tons) in 6 provinces**

No	IF-MSF	SSF	SSFiR	FiA	TSA
Kampong Chhnang	17,000	14,000	9,000		
Pursat	12,500	11,500	7,500		
Battambang	10,500	11,000	7,200		
Banteay	1,550	3,500	2,500	<b>173,450</b>	<b>537,000</b>
Siem Reap	11,500	13,200	8,500		
Kampong Thom	12,000	13,000	7,500		
Total	65,050	66,200	42,200		

**Table 2 Fish distribution on the different uses in 2009**

Fresh fish products	Domestic market	56,000
	Foreign market	14,000
Processed fish products	Domestic market	12,800
	Foreign market	3,200
	Domestic market	307,200
	Foreign market	76,800
Bait fish products	Domestic market	N/A
	Foreign market	67,000
Total (tons)		<b>537,000</b>

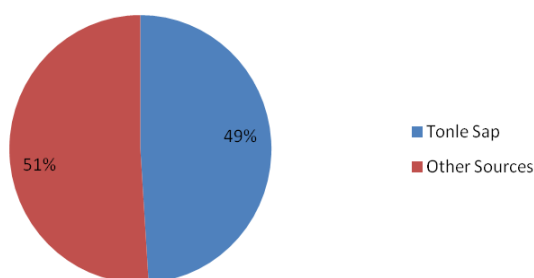
**Table 3 Fish species of fresh and processing fish products for domestic market**

No	Khmer name	Commerce name	Scientific name
1	Trey andaing	Walking catfish	<i>Clarias macrocephalus</i>
2	Trey chanteas phluk	Asiatic minnow	<i>Paralaubuca typus</i>
3	Trey chhkuk	Giant barb	<i>Cyclocheilichthys enoplos</i>
4	Trey chhlonh	Peacock eel	<i>Macrogathus siamensis</i>
5	Trey chhlang	Blackspotted catfish	<i>Hemibagrus nemurus spp</i>
6	Trey chhpin	Goldfin tinfoil barb	<i>Hypsibarbus suvattii spp</i>
7	Trey chrorkaing	Sickle fin barb	<i>Puntioplites falcifer</i>
8	Trey diep/chdor	Giant Snake Head	<i>Channa micropeltes</i>
9	Trey damrey	Marble goby	<i>Oxyeleotris marmorata</i>
10	Trey kahè	Silver Barb	<i>Barbodes gonionotus</i>
11	Trey promah	Boeseman croaker	<i>Boesemania microlepis</i>
12	Trey slat	Bronze featherback	<i>Notopterus notopterus</i>
13	Trey sanday	Sheatfish	<i>Wallagonia attu</i>
14	Trey ta aun	Butter catfish	<i>Ompok hypophthalmus</i>
15	Trey riel top	Siamese mud carp	<i>Henicorhynchus siamensis</i>

The data of FiA and TSA in 2009 are quite different from each other because the method to collect data was different. Because the study was under the department of Tonle Sap Authority, the study used data of TSA for reference. After collecting data of fishing products around the lake, the study separated it with various uses as in Table 2.

The study had asked for the fish species collected from Tonle Sap Great Lake. There were some usual sold-species from the lake into domestic markets as described in Table 3. However, there were about 10 fish species that were listed.

**Tonle Sap Supply Percentage**



**Fig. 2 Fresh fish products supplied in 2010 by Tonle Sap Great Lake**

As shown in Fig. 2, the supply of fisheries products from Tonle Sap Great Lake is about 49% and the rest is from other sources while the demands of fish products reached about 1,102,500 tons a year for the current population, 2010.

**Table 4 Type of fish processing in Tonle Sap Great Lake**

Types	Fish Species, Khmer	Commerce name	Scientific name
Smoke fish	Trey riel top	Siamesae mud carp	<i>Henicorhynchus siamensis</i>
	Trey linh	Lesser bighead carp	<i>Thynnichthys thynnoides</i>
	Trey kesh	Reddish sheatfish	<i>Wallago attu</i>
	Trey Phtong	Congaturi halfbeak	<i>Hyporhamphus limbatus</i>
Salt dried fish	Trey promah	Boeseman croaker	<i>Boesemania microlepis</i>
	Trey kanchos	Striped catfish	<i>Mystus atrifasciatus</i>
Sun dried fish	Trey kanchos	Striped catfish	<i>Mystus atrifasciatus</i>
	Trey phtuok	Chevron snakehead	<i>Channa striata</i>
	Trey promah	Boeseman croaker	<i>Boesemania microlepis</i>
Fermented fish paste called Brahoc	Trey riel top	Siamesae mud carp	<i>Henicorhynchus siamensis</i>
	Trey linh	Lesser bighead carp	<i>Thynnichthys thynnoides</i>
	Trey kawmphleanh	Three spot gourami	<i>Trichogaster microlepis</i>
Pasted fish called Pa Ork	Trey phtuok	Chevron snakehead	<i>Channa striata</i>
	Trey diep	Giant snakehead	<i>Channa micropeltes</i>
	Trey chhlonh	Peacock eel	<i>Macragnathus siamensis</i>
Frozen fish	Trey chhlang	Blackspotted catfish	<i>Hemibagrus nemurus spp</i>
	Trey chdor	Giant snakehead	<i>Channa micropeltes</i>
	Trey kesh	Reddish sheatfish	<i>Wallago attu</i>
	Trey slat	Bronze featherback	<i>Notopterus notopterus</i>

### Identification of market channel and value added in domestic markets

The most alerting component of the fish marketing system in Cambodia was the supply chain and distribution channels before fish products reached consumers. There were many middlepersons essential for the fish trade. The fish market channel started from fishers/lot owners/cage/pond culture to collectors/middleman, to wholesalers/traders, to semi-wholesalers/second traders, to retailers, and to domestic consumers. Table 5 shows value added from each transaction regarding some fish species, which was estimated by the study..

**Table 5 Value added of fresh fish products for domestic markets**

Fresh fishing products		Fisher	Trader	Distributor	Consumer	Margin
Walking catfish	Price (r/kg)	3,500	4,500	6,000	7,000	3,500
	% of final price	50%	64%	86%	100%	50%
Striped catfish	Price (r/kg)	2,000	3,000	3,500	4,500	2,500
	% of final price	44%	67%	78%	100%	56%
Chevron snakehead	Price (r/kg)	4,500	7,500	9,000	14,200	9,700
	% of final price	32%	53%	63%	100%	68%
Giant snakehead	Price (r/kg)	6,000	13,000	14,000	16,300	10,300
	% of final price	37%	80%	86%	100%	63%

Marketing margins for the eight species study ranged from about 50 to 80 percent. Prices offered to fishers represent only about 25-45 percent of the final retail price. According to Yim and Mckenney (2003) the marketing margin of three species ranged from 65 to 75 percent of the consumer's prices. These showed there was not so much difference in the value added in 2003 and 2010, but the prices of fish products were higher in 2010 than those in 2009 because of the inflation and the higher demand.

**Table 6 Value added of processed fish products**

Marketing process			Fisher	Trader	Distributor	Consumer	Margin
Fermented Small fish paste	Three spot gourami	Price (r/kg)	2,500	6,000	7,100	8,300	5,800
		% of final	30%	72%	86%	100%	70%
Smoke Fish	Reddish sheatfish	Price (r/kg)	12,000	80,000	105,000	117,000	105,000
		% of final	10%	68%	90%	100%	90%
Sun Dried Fish	Giant snakehead	Price (r/kg)	7,000	30,000	35,000	40,000	33,000
		% of final	18%	75%	88%	100%	83%
Salt Dried Fish	Striped catfish	Price (r/kg)	3,500	10,000	13,000	15,600	12,100
		% of final	22%	64%	83%	100%	78%

Marketing margins for the four fish processing study ranged from about 65 to 90 percent. Prices offered to fishers represent only about 15-35 percent of the final retail prices but the consumers have to add about 50-90 percent of the final fish prices. The highest prices are generally added to the reddish sheatfish and giant snakehead. They are sold at the highest prices in the market. These are connected to the demand preferences and the human behavior at the fish marketing.

## **CONCLUSION**

There were many fish species involved in the trade of both domestic market such as bronze featherback, chevron snakehead, boeseman croaker, asian bonytongue, clown featherback, silver barb, giant snakehead, reddish sheatfish, frecklefin eel, blackspotted catfish, sickle fin barb, giant barb, and peacock eel. Moreover, the price changed from each transaction. The main actors of the supply chain of fishery product markets were the fishing lot owners, fishers, fish collectors, wholesalers, trader/middleperson, and retailers. Therefore, the fish market channel was from fishing lot/pond/cage owners to the consumers. The existing infrastructure of marketing and trading of freshwater fisheries products was still poorly developed in terms of landing, storage, preserving, transportation, and retail facilities. The study described the market channel of the fish species in Tonle Sap Great Lake and showed mostly the fish market transaction in which the fish value was added from hand to hand.

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