

Fishery Catch Distributions of Small-Scale Marine Fisheries in Cambodia

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Abstract

Interviews at individual houses and information gathering through group discussions were conducted regarding the distribution and pricing system of marine fishery products in six fishing villages along the coast of Cambodia. Information was obtained from 290 households and 17 distributors. The distribution of marine products in Cambodia involved fishers, distributors, retailers, and consumers, and there was no specific distribution system. Although the price of marine products was negotiated between the seller and the buyer, the price was affected by the relationship among them, the type of catch, and fishery seasons. The marine fishery catch of the six villages was distributed to inland cities such as Phnom Penh, Siem Reap, Kampong Speu, Kampong Cham, and Kampong Thom. In addition, three villages exported seafood to Thailand and Viet Nam.

Introduction

The royal government of Cambodia has recognized the importance of the fishery sector through the Fisheries Administration (FiA) in food supply and economic activities (FiA, 2020). Fishery products provide essential nutrition and vitamins to the population of Cambodia (Vilain and Baran, 2016), covering approximately 81.5 % of the total protein intake (FiA, 2010). Thus far,

inland fisheries have been highlighted as an important protein source and job generator in Cambodia (e.g., Hori *et al.*, 2006; Ishikawa *et al.*, 2017). The fish amount from marine capture fisheries in Cambodia had increased 3.5 times over the last two decades (FiA, 2021), and small-scale marine capture fisheries play a vital role in creating employment, boosting the coastal economy, and providing food security for rural poor fishers (Chin *et al.*, 2021). In order to achieve the sustainable development of coastal

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society and sustainable fishery, it is necessary to create effective and rational management measures to control marine fishery (Chin *et al.*, 2021).

On the other hand, a lack of reliable data and information for the formulation of the legal framework of marine fishery management and seafood safety has been suggested in many areas (Cato, 1998). In Cambodia, although for inland fishery several papers including fisheries data have been published and the Community Fishery Development Department (CFDD) of FiA has been collecting information on fishery activity in cooperation with local villagers (McKenney and Prom, 2002; Thay, 2002; Ishikawa *et al.*, 2017), for small-scale marine fishery, such information and data are quite limited (Chin *et al.*, 2021), growing beyond its inland fisheries was a result of the nation's socio-economic interests (Sokhan, 2002).

Small-scale fishing along the tropical coast is characterized by multiple fishing gear and multi-target species with a high variety of distribution routes (Ishikawa *et al.*, 2017; Yagi, 2019). It seems that the systematic and regular data and information collection of small-scale coastal fisheries implemented in developed countries, including Japan, are difficult in the tropical zone. For more than 20 years, several projects and programs have been conducted to develop systematic fisheries data collection systems in Southeast Asian countries, and the collected fisheries statistics data have not been sufficient to evaluate the precise stock status of each important fisheries resource (Ishikawa *et al.*, 2017). In addition, given the importance of the coastal small-scale fishery in Cambodia (Chin *et al.*, 2021), fisheries statistics data and information will be used not only for stock evaluation and regulation of fisheries activity, but also for livelihood improvements of fishers and sustainable rural development. Yagi (2019) pointed out that the value of fish in Southeast Asia is greatly affected by the cost of

transportation and handling in the market, in addition to the species and characteristics of the fish. In this regard, various information regarding fishery activities, including postharvest situations, fish trading, and processing, should be targeted in systematic fisheries statistics systems (Hori *et al.*, 2009; Tiaye *et al.*, 2018).

Approximately 70 % of marine products have been exported to Thailand, Hong Kong, and Viet Nam, due to the small size of domestic market (Sokhan, 2002). A formal trading system for marine fishery products does not exist in Cambodia, where the intermediary was assumed as the main distributor within the country and across borders, and a product's availability and demand affect the price determination (Chin *et al.*, 2021). The studies so far conducted, focused on the abstracts of the distributions of marine products in Cambodia, however there were few previous studies of the marine product distribution from fishery to the domestic food markets. Furthermore, there are some gaps between the national fisheries statistics and the actual situation of the small-scale marine fisheries, although marine fisheries statistics have been compiled annually (Sokhan, 2002).

Therefore, quantitative survey was conducted to obtain precise data on the distribution of marine fishery products in small-scale coastal fisheries for analysis. Furthermore, the conducted survey was comprehensive which covered main target species of fishers in the three main coastal provinces of Cambodia that shared high proportions of marine fish catches from small-scale fisheries (FiA, 2020 and 2021).

Materials and methods

The study areas were the following six villages in three coastal provinces in the southern part of Cambodia: Trapeang Ropov and Trapeang Sangkae villages in Kampot Province, Angkaol and Ou Krasar villages of Kep Province, and

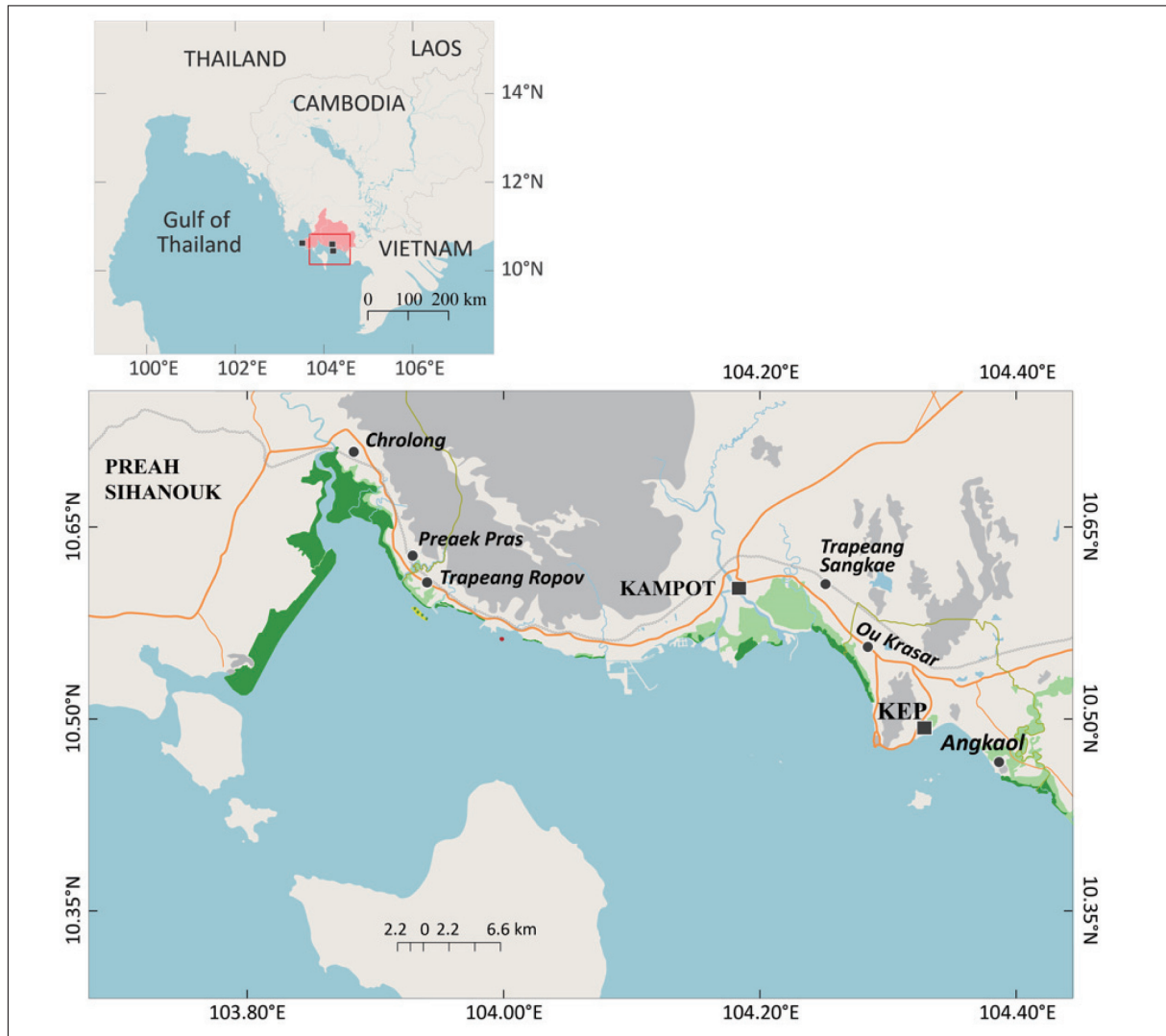


Fig. 1. Map of study areas. Study villages [●], towns [■], provincial border [—], main road [—], water body [—], wetland [—], and mangrove [—].

Chrolong and Preaek Pras villages of Preah Sihanouk Province. These three provinces share a high proportion of marine fish catches from small-scale fisheries, estimated at approximately 82.6 % in 2019 (FiA, 2020 and 2021). The fishing areas of these six villages are located along the coastline and channel in Kampot, Kep, and Preah Sihanouk Provinces (Fig. 1).

The general data and information of the target villages including number of fishers and intermediaries, names of community head, main

fishing gears, and addresses of fishers and intermediaries, community offices and landing sites were collected from provincial Fisheries Administration Cantonment (FiAC) offices. Then, all intermediaries who conducted trade businesses constantly in each village were selected for interviews, and target fish households were selected randomly based on the general information collected from FiACs in the six villages. The number of target households interviewed was calculated using the following

formula based on Miyata (2018):

$$N \geq \frac{P}{\left(\frac{B}{K}\right)^2 * \frac{P-1}{A*(1-A)} + 1}$$

where N is the required number of households, P is the total number of fishing households in a survey area, B is the relative accuracy (0.1), K is the significance level (1.96) for 5 %, and A is the population rate of 0.5.

The household interviews and group discussions with fishers and intermediaries were conducted for detailed data from December 15, 2019, to January 8, 2020, and from December 1, 2020, to January 12, 2021. In the first period of the field surveys, interviewers visited each house, landing site, or both to conduct interviews with the household heads and boat owners, with the assistance of FiAC officers. When the interviewee was not available, the interview was postponed until they were available. If the selected interviewee declined to be interviewed, another was selected to replace them from an ethical perspective. In the second period of the field survey, the heads of community fisheries or heads of respective villages assisted in making appointments with respondents in advance due to the restriction gathering measures against COVID-19.

The data and information obtained from interviews with fishers included the volume of

fish catch and selling, fishing season, customer, transportation and destination of marine fishery products, names, sizes and unit price of target species, price decision making, and choice to sell the catch after landing. Information on the prices of target species at purchasing and selling, price decision mechanisms, compositions of fishery products according to the destinations, and customers were collected from intermediaries.

In the interview survey, the interviewer firstly explained the purpose of the survey to the interviewee and promised the limitation of obtained information use to only the survey purpose, and then obtained approval from interviewee. After getting approval from the interviewee, the interviewer read the agreement on the handout sheet and asked the interviewee to sign or thumb on the paper to confirm the agreement. Form of written agreement was appeared in Appendix 1.

SPSS, R software programs, and Microsoft Excel were used to analyze the data.

Results

In total, there were 290 fishers and 17 intermediaries in the six villages: 80 fishers and 4 intermediaries in Trapeang Ropov, 43 fishers and 3 intermediaries in Trapeang Sangkae, 57 fishers and 3 intermediaries in Angkaol, 47 fishers and 3 intermediaries in Ou Krasar, 46 fishers and 2 intermediaries in Preaek Pras, and

Table 1 Number of respondents in the six study villages of three provinces

Name of provinces	Name of villages	No. of HHs fishers	No. of interviewed fishers	No. interviewed intermediaries
Kampot	Trapeang Ropov	468	80	4
	Trapeang Sangkae	76	43	3
Kep	Angkaol	137	57	3
	Ou Krasar	92	47	3
Preah Sihanouk	Preaek Pras	86	46	2
	Chrolong	21	17	2
	Total	880	290	17

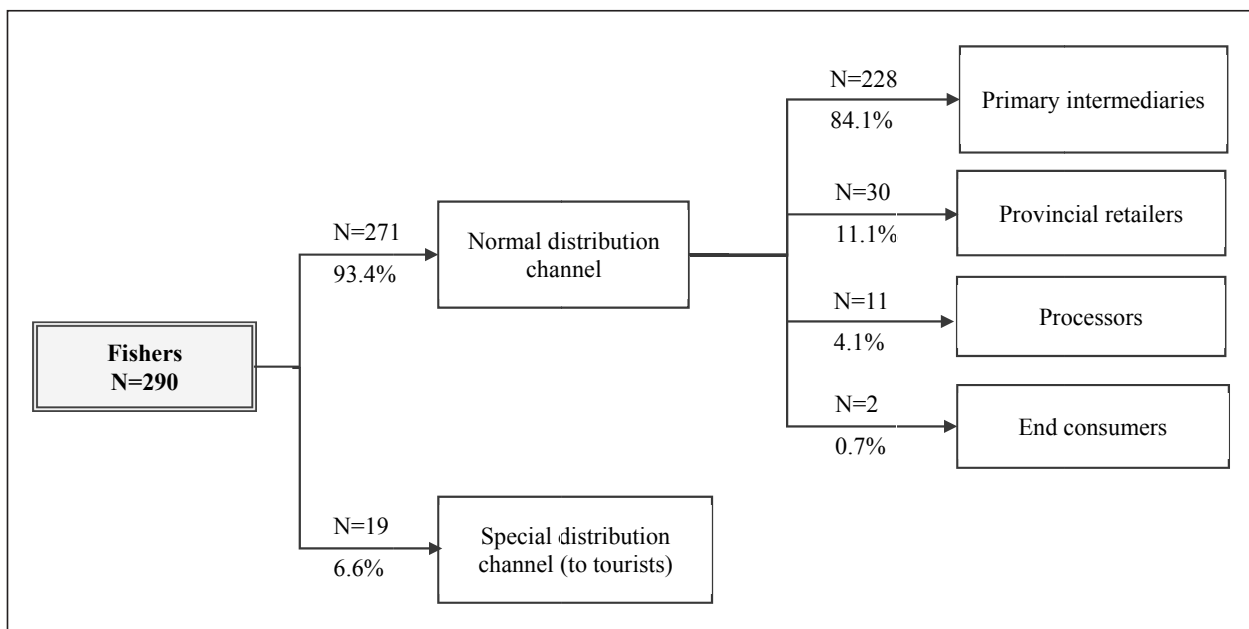


Fig. 2. Distribution channels of marine fishery products by fishers in the six study villages

17 fishers and 2 intermediaries in Chrolong (Table 1).

Primary distributions of marine fishery products

In the six villages, there were two distribution channels of marine fishery products: 1) a normal distribution in which intermediaries, retailers, processors, and end consumers are buyers, and 2) special distribution where tourists are potential buyers (Fig. 2). Almost all fishers (93.4%) in the study areas sold their fishery catches through the normal distribution channel, and the remaining (6.6%) sold through the special channel. Overall, 84.1% of 228 fishers sold marine products to intermediaries in the villages, 11.1% and 4.1% sold fishery products to retailers and processors, respectively, and only 2 fishers (0.7%) sold to end consumers (Fig. 2).

1) Normal distribution channels

In the villages, the intermediaries purchased almost all marine products (31 products), excepting Pacific bean donax and Tiger moon

snail, the retailers purchased 20 kinds of marine products and the end consumers purchased 18 products, although the processors treated only short mackerel and Singapore vinegar crab (Table 2). The intermediaries were categorized into four groups based on their treated species as “fish,” “crab,” “squid/shrimp,” and “mix” (Table 3). “Fish-intermediary” collected all kinds of fish species and stingray. “Crab-intermediary” targeted all kinds of crab species, blood cockles, and shellfish. “Squid/shrimp-intermediary” targeted squid, octopus, cuttlefish, all kinds of shrimp, and mantis shrimp. “Mix species intermediary” collected all kinds of marine fishery products. The fish, crab, and squid/shrimp intermediaries conducted their jobs in Trapeang Ropov, Trapeang Sangkae, Angkaol, and Ou Krasar villages, whereas the mix species intermediaries operated in Chrolong and Preaek Pras villages (Table 3).

The processor was the main buyer of short mackerel. 68.75% of the mackerel gillnet fishers in Trapeang Ropov village directly sold short mackerel to the processors, and they made

Table 2 Main and sub buyers of each fish product, circles and triangles suggest main and sub buyers, respectively.

Fishery product	Intermediary	Retailer	Processor	End Consumer
Bay sillago	○	○		○
Chacunda gizzard shad	○			
Common geloina	○	○		
Cuttlefish	○	○		△
Dog conch	○	○		
Fourfinger threadfin	○	△		△
Giant freshwater prawn	○			
Gould's razor shell	○	○		△
Grouper	○			△
Halfbeak	○			△
Indian threadfin	○			
Krill	○			
Mantis shrimp	○	△		△
Mud crab	○	△		△
Mullet	○	△		△
Octopus	○	○		○
Pacific bean donax		○		
Quadrate horn shell	○	○		
Rabbitfish	○	○		○
Seabass	○			○
Short mackerel	○	△	△	
Shrimp scad	○			
Shrimp*	○	○		○
Singapore vinegar crab	○		○	
Snake eel	○	○		
Spanish mackerel	○			
Spotted catfish	○			
Squid	○	△		△
Stingray	○	○		○
Swimming crab	○	△		△
Tiger moon snail		○		
Wrasse	○			△
(Mixed fish)	○			△

* Shrimps including Banana, western king, green tiger, giant tiger shrimps

Source: Interview survey and focus group discussion with fisherfolks in 2019-2021

steamed short mackerel at the landing site and transported them to different provinces and to Thailand. The offshore mackerel gillnet fisheries produced 100.5 kg and 57.3 kg per operation on average during the high and low catch seasons, respectively, while the inshore one landed 36.0 kg and 22.5 kg per operation in the high and low catch seasons, respectively. Most of them

preferred to allocate time for fishing and taking rests, so they intend to sell their fishery catch to processors at once. In addition, the store of the processor located near the landing sites also made it easy to sell fish to processors.

Female retailers, wives, and relatives of fishers took notable responsibility for selling the marine

Table 3 Types of intermediaries in the six study villages

Types	Trapeang Ropov	Trapeang Sangkae	Angkaol	Ou Krasar	Chrolong	Preaek Pras
Fish*	○	○	○	○		
Crab*	○	○	○	○		
Squid/ shrimp*	○	○	○	○		
Mix species*					○	○

- * - “Mix species intermediary” collected all kinds of marine fishery products
 - “Fish-intermediary” collected all kinds of fish species and stingray
 - “Crab-intermediary” targeted all kinds of crab species, blood cockles and shellfish
 - “Squid/shrimp-intermediary” targeted squid, octopus, cuttlefish, all kinds of shrimp and mantis shrimp

catch to the end consumers at the roadsides, markets, and houses (Fig. 3). They are responsible for all stages of the trades of their fishery products; in many cases, the negotiation of price decisions and management skills would not be high. Also, 59 fishers who did not borrow money from intermediaries accepted the lower prices suggested by the buyers. Nonetheless, results of the interview with 21 fishers who vend their catches directly to end consumers stated that due to the increase in population and the recognition of the importance of marine fishery products, the popularity of demand from domestic consumers had recently increased, which encouraged small individual vendors to continue trading marine fishery products. Human networking and connections together with information technology helped accelerate broader marine fishery markets and increase convenience in trading; for example, fishers’ wives in Trapeang Ropov and Trapeang Sangkae villages have been operating their smartphones to sell the catch to end consumers in different places and receive payments through bank/money transfers. In this regard, the heads of community fisheries in each village reiterated during the group discussion that the skills in price decision and management of the wives and relatives of fishers were expected to improve fishers’ incomes in the villages.

2) Special distribution channels

The establishment year of the Crab market by fishers in the Chroy Dong area of Kep Province was not shown in the field survey; the market infrastructure was built by the Kep Ville governor in 2005, and it was officially promoted by the Kep government. The purpose of this market creation was to promote direct selling of seafood to tourists by fishers and to improve their livelihoods.

17.5 % and 19.1 % of fishers, including their wives and relatives in Angkaol and Ou Krasar villages, spent 2–5 hours per day selling their products to the tourists in the Crab market. This direct sale resulted in better incomes of 52,500 KHR/day and 45,000 KHR/day, compared to selling to the intermediaries and/or to the end consumers at the provincial markets, respectively.

Mr. PHEUN Phalla, the vice chief of the Kep Fisheries Administration Cantonment, stated that the market has improved fishers’ livelihoods through higher benefits from seafood selling. In addition, fishers built bigger houses and became able to own motorcycles and/or vehicles after the market was formed. In addition, their children started to go to high schools, and several of them became able to send the children to attend university, which had not been accessible in the past.



Fermented Singapore vinegar crab or Kdam Brei



Krill paste or Kapi



Boiled crab meat by very small-scale processor



Steamed short mackerel



Roadsides and fisher's house



Mobile market using bicycle to move around

Fig. 3. Photos of processed marine fishery products, and trading places in the study villages

Secondary transportation and destinations

The marine fishery products sold from fishers to intermediaries in the village were transported to other villages and cities by intermediaries. The intermediaries transport the fishery

products themselves and resell them to other intermediaries. The fisher and primary intermediary played a role in distributing the fishery products to other provinces and Phnom Penh. The secondary intermediaries constitute key distributors of marine fishery products in their respective provinces. The provincial

Table 4 Fishing seasons and prices of marine fishery products at primary intermediary's store and final destinations

Fishery product	Catch seasons		Average size* ¹ (cm)	Unit price (1,000 KHR/kg)* ²				Distribution area* ³
	High catch	Low catch		High catch		Low catch		
				Purchase	Sale	Purchase	Sale	
Shell fish								
-Blood cockles	Jan-Jul	Aug-Dec	3.5	15	20	20	25	Provincial, Domestic
-Dog conch	Year round	Year round	3.5	30	33	35	38	Provincial
-Gould's Razor shell	Year round	Year round	9.0	10	12	15	18	Provincial
-Quadrate horn shell	Year round	Year round	3.0	10	12	12	15	Provincial
-Common geloina	Year round	Year round	3.0	20	23	25	27	Provincial
-Pacific bean donax	Year round	Year round	3.0	5	8	8	10	Provincial
Shrimp scad	Nov-Jun	Jul-Oct	12.0	22	24	25	26	Provincial
Mullets	Mar-Sept	Oct-Feb	27.5	15	17	20	22	Provincial
Halfbeak fish	Nov-Jun	Jul-Oct	27.0	7	8	12	13	Provincial
Wrasse	Nov-Jun	Jul-Oct	21.5	4	5	7	8	Provincial
Spotted catfish	Mar-Sept	Oct-Feb	20.0	20	22	25	26	Provincial
Rabbitfish	Nov-Jun	Jul-Oct	16.5	8	9	10	12	Provincial
Bay sillago	Nov-Feb	Mar-Oct	15.0	10	12	15	16	Provincial
Chacunda gizzard shad	Aug-Dec	Jan-Jul	5.0	1	2.5	1.5	2.5	Provincial
Mixed fishes	N/A	N/A	N/A	6	N/A	10	N/A	Provincial
Singapore vinegar crab	Nov-Mar	Apr-Oct	3.0	8	10	10	15	Provincial
Snake eel	Year round	Year round	60.0	2	20	22	20	Provincial
Mud crab	Oct-Mar	Apr-Sept	10.0	50	60	60	65	Provincial
	Oct-Mar	Apr-Sept	8.0	20	28	30	35	Provincial
Squid	Nov-Jun	Jul-Oct	12.0	15	22	20	28	Domestic
Krill	Year round	Year round	N/A	6	8	7	10	Domestic
Mantis shrimp	Nov-Jun	Jul-Oct	17.0	100	120	180	200	Provincial, Domestic
	Nov-Jun	Jul-Oct	12.0	15	22	20	28	Provincial, Domestic
Giant freshwater prawn	Jun-Oct	N/A	12.0	100	120	N/A	N/A	Provincial, Domestic
	Jun-Oct	N/A	10.0	70	100	N/A	N/A	Provincial, Domestic
Cuttlefish	Nov-Jun	Jul-Oct	6.5	15	20	20	25	Provincial, Domestic
Octopus	Nov-Jun	Jul-Oct	13.0	15	23	20	25	Provincial, Domestic

Table 4 Cont'

Fishery product	Catch seasons		Average size ^{*1} (cm)	Unit price (1,000 KHR/kg) ^{*2}				Distribution area ^{*3}
	High catch	Low catch		High catch		Low catch		
				Purchase	Sale	Purchase	Sale	
Stingray								
-Whitespotted whipray	Nov-Jun	Jul-Oct	17.0	15	18	20	23	Provincial, Domestic
-Scaly whipray	Nov-Jun	Jul-Oct	16.0	15	18	20	23	Provincial, Domestic
-Bluespotted maskray	Nov-Jun	Jul-Oct	15.0	15	17	20	23	Provincial, Domestic
-Bluespotted fantail ray	Nov-Jun	Jul-Oct	10.0	10	15	15	18	Provincial, Domestic
Stingray								
-Whitespotted whipray	Nov-Jun	Jul-Oct	17.0	15	18	20	23	Provincial, Domestic
-Scaly whipray	Nov-Jun	Jul-Oct	16.0	15	18	20	23	Provincial, Domestic
-Bluespotted maskray	Nov-Jun	Jul-Oct	15.0	15	17	20	23	Provincial, Domestic
-Bluespotted fantail ray	Nov-Jun	Jul-Oct	10.0	10	15	15	18	Provincial, Domestic
Grouper								
-Orangespotted grouper	Nov-Jun	Jul-Oct	23.0	25	32	30	40	Provincial, Domestic
-Malabar grouper	Nov-Jun	Jul-Oct	30.5	30	40	40	50	Provincial, Domestic
Spanish mackerel	Nov-Jun	Jul-Oct	40.0	20	25	25	30	Provincial, Domestic
	Nov-Jun	Jul-Oct	28.0	13	15	15	20	Provincial, Domestic
Indian threadfin	Nov-Jun	Jul-Oct	32.0	20	24	25	28	Provincial, Domestic
	Nov-Jun	Jul-Oct	25.0	13	15	15	18	Provincial, Domestic
Fourfinger threadfin	Jun, Nov, Dec	Jul-Oct, Jan-May	30.0	25	27	30	32	Provincial, Domestic
	Jun, Nov, Dec	Jul-Oct, Jan-May	20.0	20	22	25	27	Provincial, Domestic
Seabass	Jun-Feb	Mar-May	28.0	20	22	25	28	Provincial, Domestic
	Jun-Feb	Mar-May	20.0	15	18	18	20	Provincial, Domestic
Shrimp								
-Green tiger shrimp	Nov-Jun	Jul-Oct	8.0	20	25	25	30	Domestic, Cross-border
-Giant tiger shrimp	Nov-Jun	Jul-Oct	8.0	25	30	30	35	Domestic, Cross-border

Table 4 Cont'

Fishery product	Catch seasons		Average size ^{*1} (cm)	Unit price (1,000 KHR/kg) ^{*2}				Distribution area ^{*3}
	High catch	Low catch		High catch		Low catch		
				Purchase	Sale	Purchase	Sale	
-Western king shrimp	Nov-Jun	Jul-Oct	7.0	20	25	25	30	Domestic, Cross-border
-Banana shrimp	Nov-Jun	Jul-Oct	8.0	18	23	22	30	Domestic, Cross-border
	Nov-Jun	Jul-Oct	7.0	15	20	20	25	Domestic, Cross-border
Short mackerel	Nov-Jun	Jul-Oct	2.0	10	13	15	18	Provincial
	Apr-Jul	Aug-Mar	20.0	12	14	15	18	Provincial, Domestic, Cross-border
	Apr-Jul	Aug-Mar	18.0	8	10	12	15	Provincial, Domestic, Cross-border
Swimming crab	Nov-Mar	Apr-Oct	9.0	30	38	40	45	Provincial, Domestic, Cross-border
	Nov-Mar	Apr-Oct	8.0	20	26	30	36	Provincial, Domestic, Cross-border

Source: Interview survey with fisherfolks and intermediary in 2019-2021

*1: In the average sizes, measured part of each product was as bellow;

- Shrimp, prawn and mantis shrimp = standard length, (from front part of carapace to the end of telson)
- Blood cockle, gould's razor shell, common geloina, Pacific bean donax, and gould's Razor shell = shell length
- Dog conch and quadrate horn shell = shell height
- Shark, octopus, cuttlefish, squid, stingray, grouper, seabass, wrasse, and snake eel = total length
- Swimming crab, crucifix crab, mud crab, and Singapore vinegar grab = shell width (from notch to the notch of carapace)
- Indian threadfin, fourfinger threadfin, and spotted catfish = standard length (from the most anterior tip of the body to the posterior end of the vertebral column)
- Spanish mackerel, short mackerel, mullet, halfbeak, shrimp scad, rabbitfish, bay sillago, and chacunda gizzard shad = fork length

*2: US dollar 1.00 = 4,000 KHR

*3: Provincial means transportations covering villages, communes, districts, and in the province. Domestic means covering the other provinces from where the fishers resided. Cross-borders refers to neighboring countries including Viet Nam and Thailand.

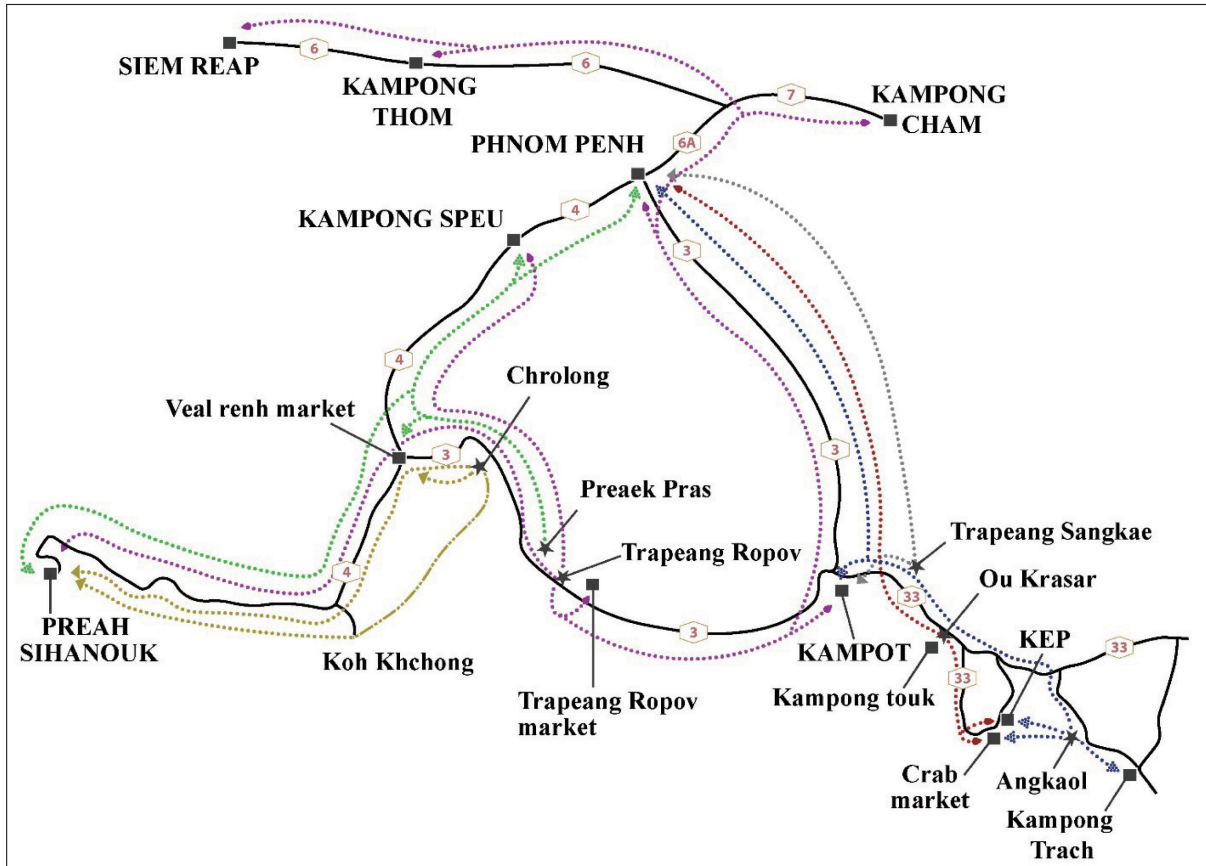


Fig. 4. Domestic distribution of marine fishery products from study villages. Study villages [★], destinations [■], main road [—], distribution from Trapeang Ropov [.....], distribution from Preaek Pras [.....], distribution from Chronlong [.....], distribution from Trapeang Sangkae [.....], distribution from Angkaol [.....], distribution from Ou Krasar [.....].

markets in each province were the destinations from the study villages. In Phnom Penh, Tralokbek Market, Old Market, Orussey Market, and Olympic Market represented destinations from the study villages and functioned as retail markets as well as the collecting places for retailers in other markets in the Phnom Penh area.

The final destinations of the marine fishery products differed according to their species and sizes, with three types of distribution areas: provincial, domestic, and cross-border (Table 4). “Provincial” means transportation covering other villages, communes, and districts in the province. “Domestic” means transportation to other provinces than those where the fishers reside.

“Cross-border” means transportation to neighboring countries, including Viet Nam and Thailand.

The distribution routes differed among villages (Fig. 4). In Trapeang Ropov village, 40 % of fishery products were transported to Phnom Penh, Kampong Thom, Siem Reap, and Kampong Cham Provinces using vehicles via National Roads No. 3, 4, 6, and 7, and 35 % were transported to the Veal Renh Market and Preah Sihanouk and Kampong Speu Provinces via National Roads 3 and 4, while 10.2 % and 6.0 % of the products were transported to Kampong Touk (hotels and restaurants and Kampong Market) and Trapeang Ropov Market, respectively, via National Roads 3 and 33.

In Chrolong village, 90 % of the marine fishery products were transported via National Roads 3 and 4 to the Real Renh market and Preah Sihanouk province, and the rest (10 %) of them were distributed within the village and commune (Fig. 4).

In Preaek Pras village, approximately 70 % of the fishery products were distributed to Preah Sihanouk Province and Veal Renh Market, and around 20 % of them were distributed to Kampong Speu Province and Phnom Penh by contracted vehicles through national roads 3 and 4 (Fig. 4). The remaining 10 % were sold within the village and commune.

In Trapeang Sangkae village, 70 % of the marine fishery products were transported to Phnom Penh by contracted vehicles via National Roads 3 and 33, 20 % of them were distributed to Kampong Speu Province, and 10 % of them were sold within the village and commune (Fig. 4).

In Angkaol village, 35 % of fishery products were transported to the Crab and Kep Markets, and 15 % of them were transported to Kampong Trach District via local roads and National Road 33 (Fig. 4). The rest (50 %) were transported to Phnom Penh via National Roads 33 and 3 (Fig. 4).

In Ou Krasar village, 55 % of the marine fishery products were distributed to the Crab and Kep Markets, and 10 % to Kampong Touk via local roads and National Road 33, while approximately 25 % of the fishery products were transported to Phnom Penh via National Roads 3 and 33 (Fig. 4).

Domestic transportation methods

The fishery products were kept in a foam box with ice (Fig. 5) when they were transported from fishing villages to each destination. The contracted vehicles was used as a method of fishery product transportation where the distance was more than 20 km from the six villages (Fig. 5). The capacity of a vehicles was

1–2 tons. The intermediary used the taxi to transport purchased marine products with an ice box. From 5 to 10 kg of fishery products were packed within the ice box at once. Some carrying vehicles were owned by the intermediary, while others were contractors with the intermediary. One carrying contracted vehicles transports 1–2 tons of fishery products collected from three to five primary intermediaries at once.

Intermediaries who did not own vehicles and/or vehicles asked passengers of the contracted vehicles to transport the fishery products to several destinations. The passenger makes a contract with the intermediary regarding the transportation of fishery products, and they transport the fish with some other commodities. Motorcycles were used to transport fishery products within the villages and communes by fishers, retailers, processors, and intermediaries. Fish transported by motorcycles usually exceed 10 kg but less than 25 kg in one trip. The fishers took their fishery catch to some nearby destinations on foot, but the amount of fishery products was less than 6 kg in this case. Boats were sometimes used by fishers to deliver fishery products to primary intermediaries within the fishers' villages.

Cross-border transportation routes and methods

In the six villages, marine fishery products landed in Trapeang Ropov, Ou Krasar, and Angkaol villages were transported to neighboring countries (Fig. 6). Only the intermediaries in Trapeang Ropov village transported fishery products to Thailand through the Cham Yeam border, and those of the two villages exported marine fishery products to Viet Nam through the Preaek Chak border.

The intermediaries in Trapeang Ropov village



Means of transportation (van and truck with foam and plastic boxes) to ship fishery products from Cambodia to Thailand



Means of transportation (motorbike with foam boxes and baskets) to ship fishery products from landing sites to Vietnam



Means of transportation (vehicle with foam boxes) of fishery products from primary intermediary's store to other provinces in Cambodia

Fig. 5. Photos of transportation of marine fishery products from the study villages to different destinations in—and out of the country.

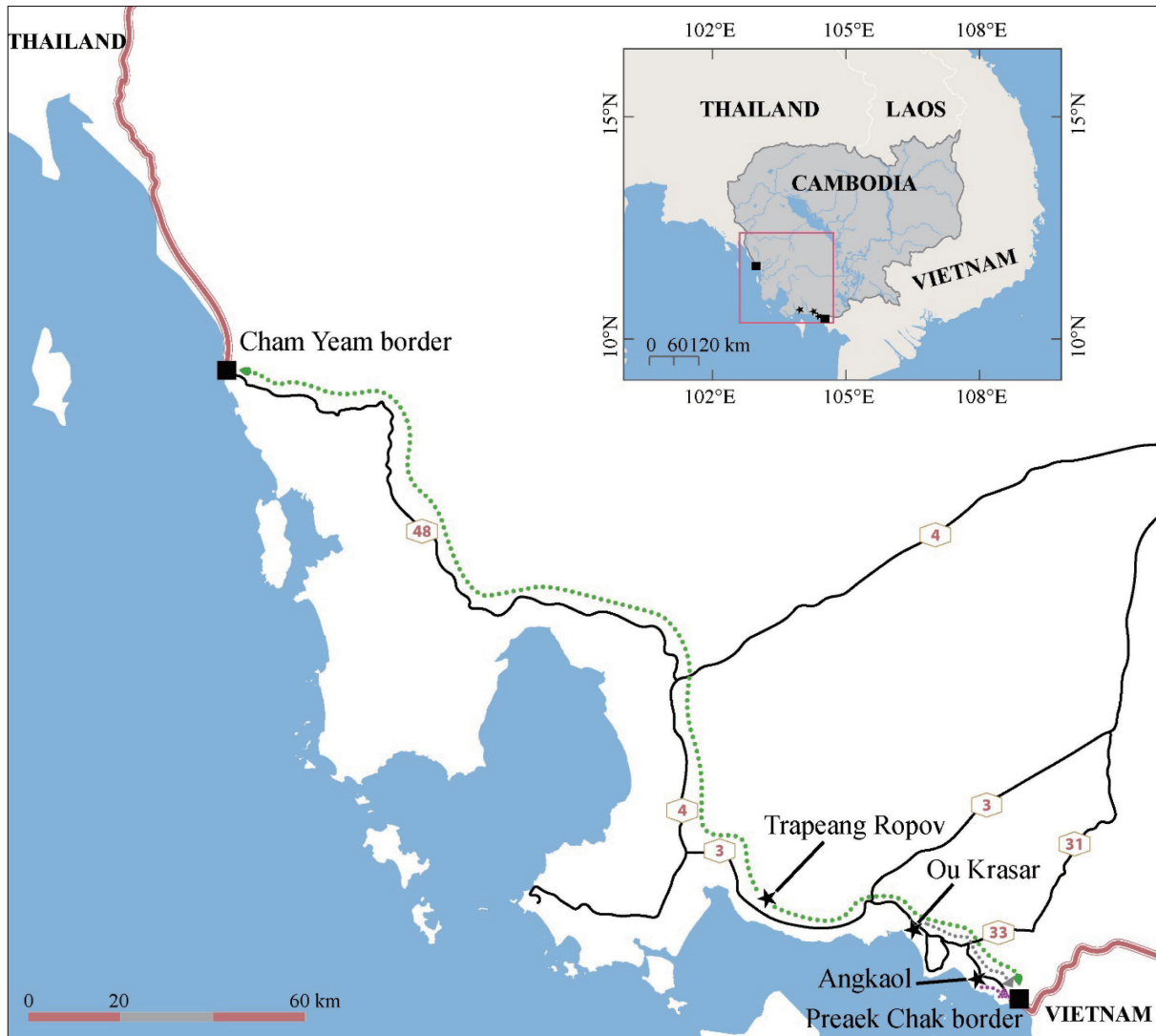


Fig. 6. Cross-border distribution of marine fishery products from study villages. Study villages [★], destinations [■], main road [—], international boundary [—], distribution from Trapeang Ropov [.....], distribution from Ou Krasar [.....], and distribution from Angkaol [.....].

informed us that they distributed marine fishery products, including fresh shrimp larger than 7.0 cm, boiled swimming crab meats, and steamed short mackerel to Thailand through the Cham Yeam border. The fresh shrimp were properly packed soon after arrival at the store (mostly in the morning). The primary intermediary gathered boiled crab meat (3–5 kg/holder/day) from the villagers and transported one ton of them per day to Thailand. They usually conduct this transportation 15 days per month. Fresh

shrimp, boiled crab meat, and steamed short mackerel were supplied to restaurants and markets in Thailand. Cross-border transportation through the Cham Yeam border was mostly performed in the late afternoon or in the evening. Therefore, landing of the exported fishery product in the fishing villages was performed at 6 to 7 AM based on the packaging and transportation times.

The medium-scale intermediary in Trapeang

Ropov village owned a van or a truck. They gathered steamed short mackerel and shrimp from one local processed house in the village and transported them to the Cham Yeum border by themselves. Detailed amounts of these exports were not recorded at these sites. In the low fishing season, some intermediaries conduct jointed transportation because of the small amount of fishery products (less than 500 kg/intermediary).

The primary intermediaries in Angkaol and Ou Krasar villages informed us that they transported 15 % and 10 % of shrimp purchased to the Preaek Chak border every day, although the exact amount has not been reported. The sizes of the shrimps exported through Preaek Chak were 3.0–6.0 cm when fresh. At the Preaek Chak border, foam boxes with ice or plastic baskets attached to a motorcycle were used to transport shrimp (Figs. 3 and 5). The processor in Viet Nam dried the fresh shrimp before selling them to the markets.

The intermediaries operating businesses in both countries resold fishery products exported to final destinations. The payment between the intermediaries was made directly by cash exchange, but in a few cases, it was done indirectly through the drivers of the vehicles.

Price decision system

The formal price decision system for marine fishery products was not found in interviews and field surveys in Cambodia. In many cases, the unit price of each species was decided through the negotiation between the sellers and buyers, where 1) the size of the fishery product; bigger sizes being sold at a higher price, followed by medium size, and the small sizes being sold at the lowest price; 2) fishing seasons; fish prices being lower in the dry season from November to April than in the rainy season

from the end of May to October due to the supply amounts of fishery products; 3) market demands and events; the prices usually going up during the national holidays and tourist seasons, were suggested as three major terms affecting the price of marine fishery products in Cambodia (Table 4). The freshness of marine fishery products is taken into account for their postharvest treatments by fishers, although it had low effects on price decisions.

Catch amounts, fishing season, and prices

Although the fishery seasons of the target species differed, fishery activities and productivity were affected by weather conditions. Fishers in the study villages usually conduct approximately 25 daytrips of fishing operations per month during the dry season (high season) and 10–15 daytrips per month during the rainy season (low season). Based on the balance between supply and demand, the unit prices of fishery products in the low season were higher than those in the high season (Table 4). Seasonal changes in the unit price of short mackerel fluctuated greatly, and many short mackerels were usually caught during the peak fishing season from November to January; however, the supply of this species is insufficient during the low season. Therefore, the highest unit price of this species was observed during the low season and fell during the peak season (Table 4).

During national holidays and the Chinese New Year, high unit prices of many species were shown because of the high demand of markets, especially in the prices of shrimp, mantis shrimp, swimming crabs, mud crabs, squid and cuttlefish, octopus, and mullet.

Post-harvest treatments, freshness, and prices

Mantis shrimp, swimming crabs, mud crabs, freshwater prawns, groupers, seabass, and blood cockles were sold alive, and shrimp, squid, cuttlefish, octopus, Indian threadfin, fourfinger

threadfin, Spanish mackerel, short mackerel, and stingray were sold in ice in the normal distribution channel (Fig. 2). However, the fishers in the research area did not perform any treatments on their catch to maintain freshness for the 4 or 6 hours on their boats until landing after fishery catch, because freshness was not highly related to lower prices of the particular fishery products.

In the case of trawl fishers, they usually used ice to maintain the quality of their catch of shrimp, squid, octopus, cuttlefish, and small fish, which were kept in ice boxes or ice rooms on the boats. The trawlers used containers filled with seawater to keep the grouper, seabass, mantis shrimp, and swimming crab alive. Some fishers targeting squid and shrimp hold the opinion that ice is an important item to maintain the quality of their catches, and they knew well that their target species were quite fragile after being fished and that low quality caused lower prices.

Negotiation between fishers and primary intermediaries

The results of this study show that almost all types of marine fishery products are purchased by intermediaries (Table 2), and most primary intermediaries set the price for marine fishery products when they deal with fishers based on their patron-client relationships. Some fishers were in debt from intermediaries when they had purchased fishing boats, fishing gears, engines, and/or fuels for fishing activities. The in-debt fishers agreed to give priority to selling their fishery products to their creditors. In the six villages, 146 of 228 fishers had loans from intermediaries and made contracts to sell their fishery products to the creditors with priority.

Although 59 of the 82 fishers in the villages were not in debt, they sold their fishery catch to the intermediary at the same price as in-debt fishers due to poor access to markets and low sales abilities of fishers. The demand for fishery products in the villages is always below the

catch, so there is not enough market in the neighborhoods. Tourists did not constantly visit the villages and landing sites, and the number of tourists was insufficient, especially on weekdays. Fishers must conduct fishing activities as much as possible to obtain the income required for daily livings; they do not have enough time to sell their fishery catch in remote areas. In addition, fishers' household members were predominantly males who were not familiar with the selling and bargaining of fishery products.

Of the 228 respondent fishers, 23, mostly trawl operators who were not in debt, could supply many fishery products and also sold their fishery products to the primary intermediary, but the prices were decided through negotiations. To use scale merits, the intermediary must collect certain amounts of fishery products for every deal. The primary intermediary in Trapeang Ropov village usually collected 1–2 tons of fishery products per day and 100–400 kg per day in the high and low seasons, respectively. The primary intermediaries in the Chrolong and Preaek Pras villages usually collected fish catches from 60 to 150 kg per day in the high season and from 20 to 60 kg per day in the low season. The intermediaries in Angkaol and Ou Krasar villages received fishery products from 100 to 200 kg and from 30 to 60 kg per day in the high and low seasons, respectively. However, fishery products from small-scale fishers fluctuate greatly owing to changes in weather conditions. During strong windy days, it drastically dropped, and it became quite difficult for the intermediary to collect enough fishery products from small-scale fishers in these villages, with the exception of trawlers. Thus, the trawlers would have relatively high power in the price-making processes with the intermediary.

In the case of giant freshwater prawns in Chrolong village, fishers did not face price bargaining with intermediaries, because freshwater prawns were caught during the

rainy season (June–October) when the consumer in the country has the highest demand for fishery products. Thus, the prices of the freshwater prawns were satisfied for both fishers and intermediaries. Giant freshwater prawns were sold at 100,000 KHR/kg or USD 25 for female prawn (10.0 cm in average size) and 120,000 KHR/kg or USD 30 for the male prawn (12.0 cm in average size).

In the case of mantis shrimp, size was the main factor in price decisions. Some fishers explained that they could sell mantis shrimp over 17.0 cm in size at high prices. Some primary intermediaries in the study villages revealed that the highest value among marine fishery products was large mantis shrimp of more than 17.0 cm in size, which traded at 120,000 KHR or USD 30 in the high production season and 200,000 KHR or USD 50 in the low production season.

Price decision between fisher and retailer

In the six villages, 30 of 271 fishers (11.1 %) sold their catches to the retailer after landing (Fig. 2). In the trade of marine fishery products between fishers and retailers, the prices were initially suggested by fishers based on the balance of their costs and catch amounts per trip. In strong winds and/or heavy rain days, fishers could not arrive at their target fishing grounds because of the low capacity of fishing boats; hence, the volumes of fishery catch were small, and the price requested by fishers was higher than usual. However, most of the time, the income per trip was not enough to meet operating costs on days with rough weather.

Price decision between fisher and processor

In the research area, processors purchased only short mackerel and Singapore vinegar crab (Table 2). The prices of these two species in the trade between fishers and processors were decided by fishers based on the sizes of the products and fishing seasons. The price gaps of short mackerel between the high (April to July)

and low (August to March) seasons were approximately 3,000–4,000 KHR/kg (Table 4). Additionally, there were unit price variations of short mackerel due to differences in sizes of products: smaller sizes (18.0 cm in fork length) were traded at cheaper prices than larger ones (20.0 cm in fork length) in both seasons. The prices of Singapore vinegar crab were suggested by fishers prior to negotiations with processors. Fishers decided the first proposed prices based on catch amounts and fishery seasons, as in the case of short mackerel. However, the fishing seasons of this species were different from those of the short mackerel, and the prices of this species are usually higher from April to October than those from November to March, and the price gaps varied around 2,000–5,000 KHR/kg (Table 4).

Price decision between fishers and end consumers

There were 21 fishers who sold their catch to end consumers by themselves in the villages and their landing sites. Most of them stated that selling their catch to end consumers is more profitable for them than selling to other buyers, including intermediaries and retailers. The end consumers purchased many kinds of marine fishery products for household consumption (Table 2), and the mixed fish were purchased as feed for livestock and aquaculture. The prices for end consumers were always decided through negotiation between fishers and buyers, and the price was usually set at a level agreed upon by both parties.

Price negotiations between primary intermediary and buyers

The intermediary sold their purchased marine products 2,000–20,000 KHR/kg higher than the price at the time of purchase, based on the costs of transporting and selling (Table 4). The transportation and selling costs of marine fishery products differed among different kinds of marine products. Some intermediaries said that

the species and size of the product affected the costs; however, detailed information was not collected in this study.

The results of this study revealed the different power of price decisions between medium-and small-scale intermediaries; the medium ones usually had much power to set the price.

The intermediary sold purchased marine products to retailers, end customers, and cross-border traders. The intermediary usually decided the prices in trades with retailers and end customers; they offered 200–1,000 KHR/kg cheaper prices to the retailers than the end consumers, because the retailers purchased much more fishery products than consumers. In the case of cross-border trade, the imported side had priority to decide the price; however, since both parties had a long-standing relationship with mutual trust, the prices were usually set at a satisfactory level for both parties.

Discussion

Domestic distribution of marine fishery products from small-scale fishery

In the study villages, the marine catches were distributed by intermediaries, retailers, processors, and consumers (Fig. 2). The intermediary in the fishing villages played a key role in collecting and distributing marine fishery products as the primary trader at the starting points. The primary intermediaries collected fishery catches from the fishers and resold them to the secondary intermediaries who carried out fishery product distributions outside of the villages. The importance and role of the intermediary have been reported in the inland freshwater fisheries of Cambodia (Sok, 2005; Seng, 2006; Hori *et al.*, 2009). The normal distribution channel to the intermediary, retailer, processor, and end consumer has also been reported in inland freshwater fisheries in Cambodia (Nao *et al.*, 2001; Sok, 2005; Seng, 2006;

Hori *et al.*, 2009). Similar importance of the intermediaries would be thought in case of marine fishery, as the same functions of them were found in both fisheries distribution systems.

Women, usually the wives and/or family members of fishers, are highly responsible for retailing and reselling to end consumers of marine products. These women's activities are similar to those of inland fishery products (Hori *et al.*, 2009). The places of selling both fishery products to end consumers were roadsides and/or fishers' houses (Fig. 3), and bicycles were used to transport small amounts of fishery products to the markets and to sell places at short distances. These activities are usually conducted by women in both fisheries.

The large differences in the distribution systems between the marine and inland fishery products in Cambodia appear in the existence/absence of wholesale markets in urban areas. For marine fishery products, no wholesale markets were found in this survey; however, the wholesale markets named Chrang Chamres for the inland fishery products is located in Phnom Penh (Hori, 2008). The Chrang Chamres Market is open twice per day from 0–4 and 12–15 o'clock, and huge amounts of the inland fishery products from capture fishery and aquaculture are gathered and then redistributed to many final destinations, including other city markets, processors, retailers, and end consumers. According to Sok (2005), marine fishery products are not sold at the Chrang Chamres Wholesale Market, but are directly sold to retail markets and end consumers, which is the main cause of the difficulty in estimating the amount of marine fishery products (Sok, 2005).

Sokhan (2002) and Seng (2006) reported that the foreign markets represented the major markets for marine fisheries products of Cambodia. They concluded the reason why the foreign market being the main sales place of the marine product was domestic unpopularity of seafood. However, in this study, larger amounts

of marine fishery products being traded domestically than those for exportation (Table 2 and 4), a few amounts of the marine fishery products including fresh shrimps at larger size more than 7.0 cm in standard length, steamed short mackerel, and boiled meat swimming crab were exported to Thailand, and small fresh shrimps between 3.0 to 6.0 cm in standard length were sold to Viet Nam. In addition, while multiple routes for domestic seafood transportation reported in this study, exports to overseas were carried out only at particular villages (Fig. 6). The difference from the previous studies seems to be due to the increase in domestic consumption of marine products in recent years. Such rapid changes in logistics will continue to be alienated in response to changes in the tourism industry. It will be necessary to continuously monitor these changes in marine fish and shellfish markets and transportation routes to understand changes of the demand of seafoods in order to ensure sustainable coastal development and domestic food safety.

The demand for marine fishery products has been rising in domestic consumption since 2013 (Nen Chamroeun, Director of Provincial Department of Agriculture, Forestry and Fisheries, Preah Sihanouk province pers. Comm, 2021; FiA, 2021). This rising demand has raised prices, which has led to shortages of particular marine products, including swimming crabs, mud crabs, mantis shrimp, shrimp, squid, and octopus. As a countermeasure for these shortages, aquaculture has been promoted in the coastal areas of Cambodia, and its products will increase (FiA, 2017). After a drastic increase in marine fishery products, including aquaculture products, changes in the distribution systems of marine fishery products, including the establishment of a wholesale market, may occur in the near future. For sustainable rural development in coastal areas and ensure the quantitative and qualitative safety of seafood, the distribution changes and handling of marine

fishery products in the markets and distribution channels should be monitored constantly. Monitoring and data collection of these changes should be conducted through collaborations of fishers, intermediaries, government staff, and researchers, because these changes happen rapidly with high variation, and official reporting systems cannot keep up (Ishikawa *et al.*, 2017).

Transportation methods and facilities.

In this survey, trucks and vehicles with ice boxes were used for transportation of marine fishery products from fishing villages, which was similar to the practice of inland fisheries in Chhnok Tru village, Kampong Chhnang Province (Hori, 2008). However, better storage systems equipped with refrigerators were used for the inland fishery products in the Rong Kluea market of Aranyaprathet District, Sa Kaeo Province, in Thailand (Hori, 2008). Small Thai companies transporting seafood products to the capital city of Lao PDR and other cities used 1.5-ton trucks with iceboxes and 10-ton trucks equipped with a freezer (-18 degrees) to maintain the quality of the products (Ishikawa *et al.*, 2008). There is a lack of cold chain facilities for transporting marine fishery products not only in Cambodia, but some practices to develop cold chains have been implemented in neighboring countries. Therefore, the differences in the storage facilities and equipment of marine fishery products among Cambodia and neighboring countries, including Thailand, should be considered when planning rural development. This contrast might reveal specific issues that need to be addressed realistically. The exports of alive fish in the seawater containers to Hong Kong and Thailand by air were mentioned in Sokhan's report in 2002, no other transportation method was found in this study. This no change would be derived from the decrease of fish catches and increase of the domestic demand of marine fishery products.

Price decision systems

The prices of marine fishery products are generally decided through negotiations between sellers and buyers in Cambodia. The species and sizes of the products and seasons strongly affected prices, with larger products generally treated as high-value than smaller ones, but their freshness had little effect on price decisions. During the dry season from November to April, prices of the marine products were lower than during the rainy season from the end of May to October due to the supply of fishery products (Table 4), and the prices also rise sharply on national holidays and weekends because of the high demands of national tourists in the coastal zones. These seasonal fluctuations in the demand and prices of fishery products have been reported in inland fisheries in Cambodia (Hori, 2008), and in the last 16 years, those changes in marine fisheries in other countries, including Thailand, have also been reported (Khy, 2006; Tiaye *et al.*, 2018).

The relationship between the seller and buyer also affects the price decision of marine fishery products. Although fishers have equal powers to define prices as retailers, processors, and end consumers, the intermediaries usually hold higher power in price decisions than fishers based on the debt fishers owe to the intermediaries. They are widely recognized as patron-client relationships, which have been reported in inland fisheries in Cambodia and coastal fisheries in Thailand (Yim and Bruce, 2003; Hori *et al.*, 2009; Arimoto *et al.*, 2017). Therefore, the intermediary can sometimes determine lower prices in the fishery catch than in the markets. Although there was no written agreement between intermediaries as creditors and fishers, fishers had less chance to sell their catch to other buyers due to the small number of intermediaries in the fishing villages. Tiaye *et al.* (2018) mentioned that a buyer's power would

eventually increase when the number of buyers is small. Hori *et al.* (2009) reported that the inland fishers at Chhnok Tru village can choose buyers even if they borrowed money from the intermediaries, because many intermediaries conduct their business at the site. The joint sales of small-scale fisheries combine the power of selling and provide a constant supply to consumers (Fushimi and Watanabe, 2017; Mochizuki, 2020). Although the ratio of fishers' household to the intermediaries in Rayong of Thailand was 3:1 based on the mode value (Tiaye *et al.*, 2018), those of in the six villages were smaller as follows; 20:1 for Trapeang Ropov, 14:1 for Trapeang Sangkae, 19:1 for Angkaol, 16:1 for Ou Krasar, 15:1 for Preaek Pras, and 9:1 for Chrolong (Table 1). It was suggested that increase of the competitions among buyers would give fishers more options to sell their fishery products and this could result to increase more fair price trades of fishery products in case of the study in Chhnok Tru village, Kampong Chhnang Province (Hori *et al.*, 2009). Therefore, increasing the number of traders and improving the market access of fishers would be the development targets in coastal fishery villages.

The wives or relatives of fishers sold their fishery catches directly to the end consumers and retailers, and the prices of the fishery products were decided based on the negotiations between sellers and buyers. Arimoto *et al.* (2017) suggested that the improvement of management skills of fishers can contribute to fair prices of fishery products and generate more income for fishers. The importance of developing women's skills to facilitate their participation in productive work, leadership performance, and full engagement in community development has been suggested (Eskola and Gasperini, 2009). The Royal Government of Cambodia (RGC) also recognized the importance of economic empowerment of women, which has been prioritized in the RGC's agenda and reflected in

national policies, including national programs addressing agriculture, rural development, and land management reform. Under the umbrella of the Gender Mainstreaming Policy and Strategy in the agricultural sector of the Ministry of Agriculture, FiA formulated an action plan for promoting gender equality in fisheries in 2016, and “the promotion of gender role’s economic empowerment through good practices of community fisheries management” has been one of the key objectives to achieve the plan (Ministry of Women’s Affairs, 2019; FiA, 2016). Therefore, gender aspects in coastal fisheries would also be a major topic for future studies.

Way forwards

The importance of the involvement of the intermediary in fishery management for fisheries has been suggested for inland fisheries (Hori *et al.*, 2009; Ishikawa *et al.*, 2017). As the intermediary has several roles and responsibilities in the distribution of marine fishery products revealed in this study, their involvement in rural development and marine fishery management should be considered. In addition, the relationships between market demands and end consumers, which were not treated deeply in this survey, should be taken into consideration for rural development plans.

As the Crab market in Kep Province has succeeded in improving fishers’ livelihoods, expanding this kind of direct selling place and improving the skills of fishers will be considered, and the impacts on societies will be examined in future studies. The roles of women will also be highlighted in rural economies, because the increase in women’s participation could contribute to poverty reduction and economic growth (Morrison *et al.*, 2007; FAO, 2013).

It was revealed in this study that many aspects of marine fishery in Cambodia have been changed over the decades. This includes the nature of trading and distribution, nutritional

sources for human consumption moving from freshwater fish to marine fish, creative ideas to promote local markets to provide fresh seafood directly to consumers, and innovative concepts to use digital technology to conduct marketing of marine fishery products, which could contribute to people’s well-being. Interestingly, this parallels some activities in the Blue Economy, including eco-tourism and renewable energy businesses, which have been gaining worldwide attention recently. The issues of expanding the relationships between small-scale marine fisheries in Cambodia and other sectors will gain importance. This social and economic change would happen in Cambodia and other countries. In this regard, research in Cambodia can provide several good examples for other countries because there is much room for change.

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和文要旨

カンボジア沿岸の6つの漁村における海産物の

流通と価格設定システムについて、個々の漁家へのインタビューとグループディスカッションによる情報収集を行った。データは290世帯と17の販売業者から入手した。カンボジアでの水産物の流通には、漁業者、流通業者、小売業者、消費者が関わっており、特定の制度化された流通システムは認められなかった。海産物の価格は、売り手と買い手の間での交渉によって決められるが、価格決定においては、売り手と買い手の関係性、漁獲物の種類、漁期が影響を与えている。6つの村の海産物は、プノンペン、シェムリアップ、コンポンスプー、コンポンチャム、コンポントムなどの内陸都市に流通しており、さらに、3つの村での漁獲物は、タイとベトナムへと輸出されていた。

Form of request for interview permission (Households)

1. Interview date and time: _____ Interviewer name: _____

2. Survey site: Fishing village/commune/district: _____

3. Province:

1 Kampot

2 Kep

3 Preah Sihanouk

1) Target individual of this questionnaire: Community fisheries households (head/members, must live in CFi/village and engage in fishing/fishing related activities)

2) Introduction of interview: Greetings, I am _____ and we are conducting a survey in your village. The aim of this survey is to find out the fish trade and distribution in marine small-scale fisheries. The conclusion of this survey depends on your responses. Could you give us sometime and cooperate with us?

3) My name is: _____ sex: _____ I live in: _____
_____ relationship with household head: _____

*Phone number: _____

I am participating voluntarily in the survey titled "*Fishery catch distributions of small-scale marine fisheries in Cambodia*".

I know and understand that:

- a) This is the survey is for PhD study of Ms. CHIN Leakhena, under Tokai University of Japan.
- b) The main purpose of this survey is to describe the distribution of marine fishery catches and issues related topic practiced in our village.
- c) All information collected and respondent's personal information will be treated with confidentially, and will only be used for PhD research purpose. Research results will be publicly revealed.

Name of respondent_____
Name of interviewer_____
Signature of respondent_____
Signature of interviewer_____
Date (day/month/year)