

Data collection methodology in the Andaman Sea and statistic on tuna fisheries.

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ABSTRACT

Thai marine fishery consists of two segments, the coastal fisheries, and oversea fisheries. The coastal fishery along the Andaman Sea is multi-gear and not exclusively for tuna fishery except for tuna-like by purseine. The organization's collectings coastal marine fisheries data are Upper Andaman Sea Fisheries Research and Development Center(Phuket) and others organizations along the Andaman Sea in fisheries department. Over sea fisheries in Thailand has conducted and reported tuna catches from two sources. The first one from Thai fishing vessels that go fishing in the high sea or water under the jurisdiction of the other country. The second, data comes from fishing boats on board at fishing ports. However, tuna fisheries from Thai vessels are not active during 2016-2017. So, the tuna data from Thailand has only been reported by tuna from foreign tuna vessel and tuna-like from purse seine landing in Phuket ports and along the Andaman Sea. The tuna vessel comes to landing at Phuket ports. There must be a procedure for reporting the type and amount of harboring. Follow the steps set by Fish Quarantine and Inspection Division. This is consistent with international principles. Operated by Phuket fish inspection office. Therefore, the sampling program can only be compiled by the record of Fish Quarantine and Inspection Division, such as Flag state, fishing area, trip date, port of loading, fishing gear, type and amount of each species. However, Thailand has collected data on catches of marine fisheries and report as the fisheries statistics of the country.

Key words : Artisanal fisheries, Commercial fisheries, Tuna long line fisheries

INTRODUCTION

Thailand is a prosperous country in the field of fisheries development and can be ranked as one of the top twenty in the world with high productivity. And also the top exporters of fishery products since 1992. The State of the World Fisheries and Aquaculture, 2014 Thailand can produce about 2.7 million tonnes of fish, including 1.77 million tonnes of natural marine products and 0.93 million tonnes of aquaculture product. In 2016 Thailand can produce natural marine products about 1.74 million tons and aquaculture production of 0.91 million tons, and the value of the marine fish product was 111.343 billion baht, representing 9.28% of GDP or 0.78% of GDP.

The Gross Domestic Product of Thailand has measured in 3 different ways, by product, income, and expenditure. About the Gross Domestic Product (GDP) in the fisheries section, use the fisheries production to measure the GDP. The GDP growth rate of the fishery sector in the past ten years (2007 - 2019) has slightly decreased. Fishing activities involve many Thais in many activities, especially in coastal areas or nearby areas. There are more than 2,000 villages. There are 55,981 households in the sea fishing census, And there is a

labor market. The fishing industry survey in 2000 reached 826,657 people in the marine fisheries sector. 161,670 people were coastal aquaculture farmers. 77,870 people were in the fisheries-related industries, 183,100 were left in the aquaculture sector, and the other was in the Freshwater Aquaculture.

According to the statistics of the Department of Fisheries, the fishery production was between 2.6-2.8 million tons. The majority of the fishery production was from the marine fishery with efficient fishing gear such as trawler net, long-line, and surrounding net. These fishing gear are used for fishing vessels of not less than 16,432 in 7 fishing areas in Thailand: Eastern Gulf of Thailand, Western and Upper Gulf of Thailand, Central Gulf of Thailand, Western and Southern Gulf of Thailand, Upper the Andaman Sea And Southern the Andaman Sea. Including fishing outside the Thai waters in neighboring countries and fishing in the high seas. One of the fisheries products is consumed as a significant source of protein for people in the country. The consumption of aquatic animals in the past ten years is between 25-30 kg/ person/year. The output was exported to the world market, bringing the currency into the country. In 2015, Thailand total aquatic catch was 1,317,200 ton, and the value trade was 59,900.2 million baht. From 1996 to 2015, the quantity of export of fish and fish product highest in 2010. The amount of fish and fish product was about two million ton and slightly decrease in 2011. In 2015, the amount of fish and fish product was approximately 1,683,390 ton.

Tuna exports statistic. In 2016, Thailand exported tuna products for 550,584 ton, and the value was 68.5 million baht. The export product reported by two types, the first is the tuna within airtight containers and The tuna not in airtight containers. Tuna products from Thailand have been sent to more than 35 countries in the world, such as United States, Australia, Egypt, Canada, and others.

STATUS OF DATA COLLECTION

Coastal fisheries

In the Andaman Sea of Thailand, the coastal fishery along the Andaman Sea is multi-gear and not exclusively for tuna fishery, but except for tuna-like species. Some of tuna-like can catch by commercial fishing gear such as purse seine, anchovy falling net, otter board trawl, and squid falling nets. The quantity of tuna-like catch by commercial fisheries was approximately 4.16% of the total catch from commercial fisheries. In the Andaman Sea, some of the artisanal fisheries can catch tuna-like such as purse seine and mackerel gill net. In the Gulf of Thailand, some of tuna-like can catch by artisanal fisheries such as purse seine, mackerel gill net, crab gill net, and hand line and pole and line. In 2016, the quantity of tuna-like catch by artisanal fisheries was approximately 0.11% of the total catch from artisanal fisheries.

Coastal fisheries in the Andaman Sea of Thailand is multi-gear and multispecies fisheries, such as purse seine and trawler. Otherwise, the specific fishing gear also has such as anchovy purse seine, falling net, traps, and dredges.

Deep Sea fisheries

Thailand began to develop Thai fleet outside of the Thai waters before the year 2002. The first was the development of fishing in the waters of neighboring countries by obtaining

fishing rights, joint ventures, the lease of Thai fishing vessels, and the purchase of tickets from residents. Fishing in the area to catch in the specific area. In the past, fisheries outside the waters of the Thai have been granted a fishing license outside of the waters. The offshore fishing license will be valid for one year and expire on 31 March of each year. Thailand has been fishing in Indonesia, Myanmar, Vietnam, Cambodia, Malaysia, Bangladesh, Mauritius, India, Yemen, and Somalia. Besides, Thailand has the possibility and potential to engage in fishing with Sri Lanka, Timor Leste, Yemen, Mozambique, Vietnam, Oman, and Madagascar. Currently, there are 17 fishing boats outside of the waters. (updated 27 January 2017 by The Thai Overseas Fisheries Association)

Fisheries in the high seas or international waters of Thai fishing vessels. Thailand has a policy of fishing outside the waters, with the aim of encouraging and developing fishing in international waters. Thailand has promoted the supply of ships to extend fishing in the high sea. Especially the tuna fishing boats. Funding / Funding Accelerate the survey of fisheries resources in international waters. And promote the integration of fisheries in international waters. In the past, 9 Thai fishing vessels are operating in the Indian Ocean, including four long-line fishing boats, five purse seine fishing nets.

DATA COLLECTION METHODS

The data collection methods adopted by Fisheries Statistics Analysis and Research Group and Fisheries Resources Assessment Group for estimating marine fish landings is multi-stage stratified random sampling over time and space which described below:

1. Area : The stratification of space is made by dividing each maritime into several zones by fishing practices and geographical considerations. They divide into 7 zones along the Gulf of Thailand and the Andaman Sea. Each fishing zones are comprehensive coverage landing site and fishing ground. Shown in Fig.1.

2. Fishing practice : They are divided into artisanal fisheries and commercial fisheries by size of the vessels. Since 2016, the methods for collecting the data for the marine statistic of Thailand has changed. Each fishing practice is collecting in each month.

2.1 Artisanal fisheries : he vessel size less than ten ton-gross

2.2 Commercial fisheries : The vessel size more than ten ton-gross

3. Sampling : The sampling is taken in each month, area, and fishing practice for the hold covering of fishing gears and fishing area.

3.1 Vessel : 20-80 % of landing vessel are taken, depending on time and number of catch.

3.2 Fish : The composition of fish is classified into group and species. Each group and species of fish are collected size and weight. Approximately 100 – 500 fish of each species for each area, time, and gear are measured. The number of measurement provides the required accuracy in size composition and catch of vessels.

3.3 Size class intervals : The size frequency is reported by 1 cm size class intervals for fish under 60 cm in fork length and 0.5 cm intervals for fish in Anchovy group. Example for size class intervals are showing as below :

13.0 – 13.9 cm = 13 cm.

14.0 – 14.9 cm = 14 cm.

15.0 – 15.9 cm = 15 cm.

And 13.0 – 13.4 cm = 13.0 cm.

13.5 – 13.9	cm	=	13.5	cm.
14.0 – 14.4	cm	=	14.0	cm.

3.4 Survey method and recording data : The systems for recording measurements are developed individually. Water-proof recording paper, measuring board and calipers are used for length measuring. The methods of recording the data are to mark the appropriate size class so that the size frequency is recorded.

4. Logbook system : Event Thailand starting uses logbook data since 2015, but now the data from logbook data is not yet complete. The fishing master cannot fill the real weight of each species in a haul. Only total catch can fill in a logbook form. However, some essential information can fill and reported such as; boat name, boat ID, vessel characteristics, trip information, type of fishing gear, vessel position, fishing operation position, the port in – port out time, estimated catch by species (now not yet for reported), and total catch.

5. Vessel monitoring system : Vessel Monitoring Systems (VMS) is a general term to describe systems that used in commercial fisheries (commercial fisheries is the vessel size > 30 ton-gross) to allow environmental and fisheries regulatory organizations to track and monitor the activities of fishing vessels. They are a crucial part of monitoring control and surveillance (MCS) programs at national and international levels. VMS may be used to monitor vessels in the territorial waters of a country or a subdivision of a state, or in the Exclusive Economic Zones (EEZ) that extend 200 nautical miles (370.4 km) from the coasts of the country. VMS systems are used to improve the management and sustainability of the marine environment, through ensuring proper fishing practices and the prevention of illegal fishing, and thus protect and enhance the livelihoods of fishers. The exact functionality of a VMS system and the associated equipment varies with the requirements of the nation of the vessel's registry, and the regional or national water in which the vessel is operating. Within regional and national VMS initiatives there are also sub-divisions which apply different functionality to different vessel categories. Categories may be size or type of vessel or activity.

6. Fisheries Single Window : Fisheries single window is the methods to match catch certificate, simplified catch certificate or another document with the Import Movement Document. So after matching, the processing statement, Declaration of whole fish exportation, self-certificate are received for export fish or fish product. This method is to avoid the marine product from IUU fishing. This method needs to reported vessel name, Flag state, Catch area, Trip date, Port of loading, fishing gear and vessel registration number or container number. This method is the one parts of customs declarations.

7. Tuna statistics : showed in table 1 and table 2. The data collection methods as above. So, the statistics of aquatic animals catch from Artisanal fisheries showed the statistic of fish from fishing gear and fishing area as below: In 2017, There are 19 gears along the Andaman Sea. The highest catch was 55,503.00 ton from jellyfish dip net. The composition of fish is almost Jellyfish. The second was another gill net, and the catch was 3,442.60 ton. Followed by Mackerel gill net, Crab gill net, crab trap, Shrimp trammel net, otter board trawl, Purse seine, Fish trap, Squid trap, Anchovy falling net, Handline and pole&line, Squid falling net, Sardine gill net, Longline, and Other gears, so the catch was 2251.10, 1549.64, 1150.30, 1108.42, 541.73, 517.00, 510.48, 393.54, 260.01, 239.53, 183.73, 154.59, 64.89, and 2.30

ton, respectively. About tuna and Tuna-like, the catch was 0.21 ton from the Squid trap. The fishing ground was in area 7th. In 2016, the catch of tuna and tuna-like species was 10 ton from purse seine, and the fishing ground was in area 7th. In 2017, the catch of tuna and tuna-like was 12802.00 ton. The highest was from purse seine, Anchovy falling net, Otter board trawl, and Squid falling net, and the catch was 12768, 24, 6, and 4 ton, respectively.

Tuna longline landing in Phuket province, Thailand started since the year 2000 (showed in table 3). The first period, there is high activity. The activity of tuna longline showed in table 3. Since 2014, the activity in tuna long line was low. The reported data was only vessel name, Flag state, Catch area, Trip date, Port of loading, fishing gear (some case), vessel registration number, catch and composition of fish (some case).

RESULT AND DISCUSSION

In the coastal fisheries along the Andaman Sea, There are some of the tuna-like species can catch from the artisanal fisheries and the commercial fisheries. The fishing gear that catches tuna-like species such as Squid traps from artisanal fisheries, Otter board trawl, Purse seine, Anchovy falling net and Squid falling net from commercial fisheries. The volume of tuna-like species from artisanal fisheries is 0.21 ton, and total catch was 67,872.86 ton. The volume of tuna-like species from commercial fisheries was 12,802.00 ton, and total catch was 308,144.00 ton (4.16% of total catch).

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Fig 1 Map : Show the data collection area along the coast of the Andaman Sea and along the Gulf of Thailand.

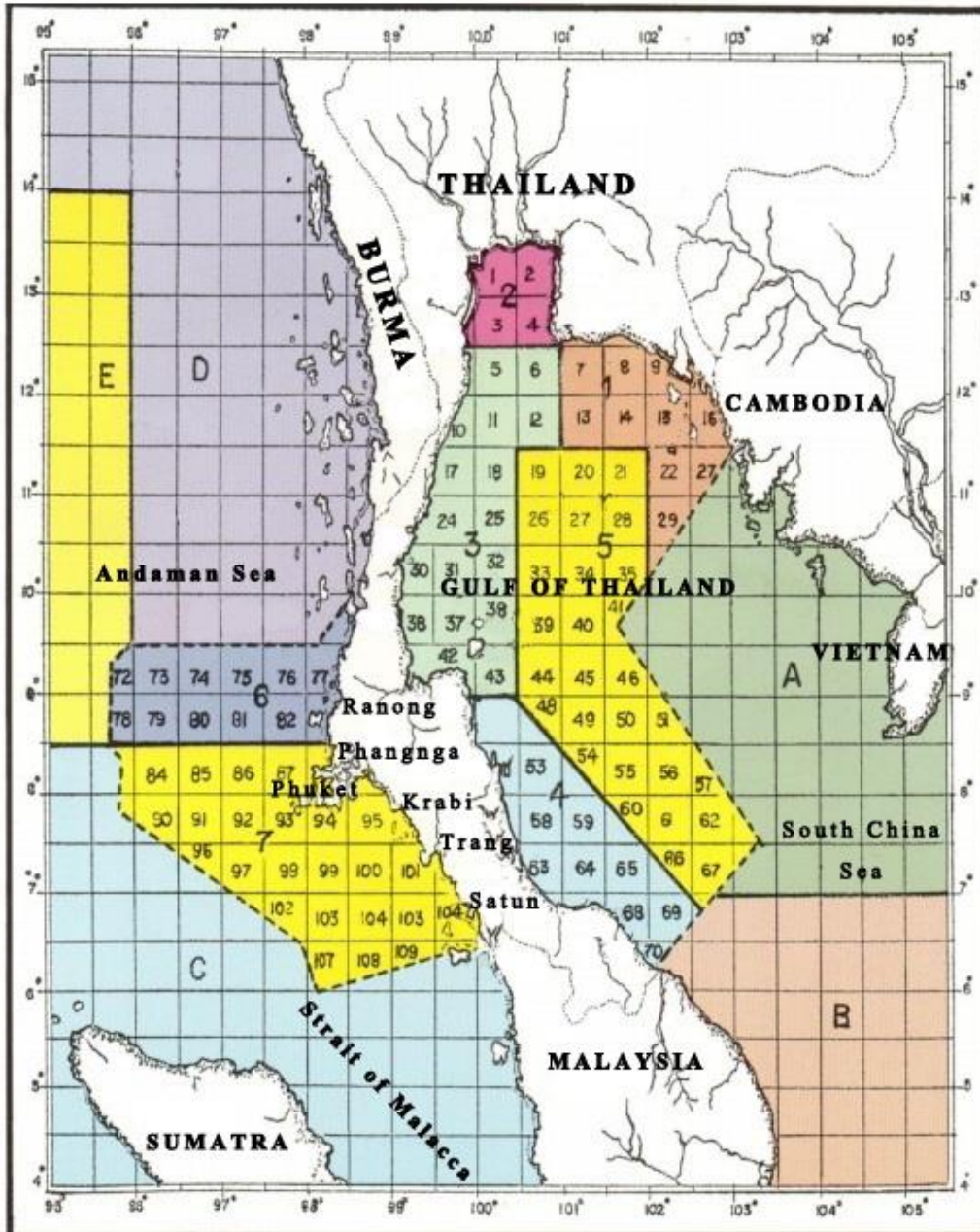


Table. 1 Marine capture production of Artisanal fishery in the Indian Ocean by fishing gear and fish group year 2017

Fishing gear	Total	Sub-total Pelagic fish	***Neritic tuna	Sub-total Demersal fish	Other food fish	Trash fish	Sub-total shrimp & prawn
Otter board trawl	541.73	6.52	-	74.59	47.30	112.11	189.56
Purse seine	517.00	330.00	-	42.00	52.00	76.00	-
Anchovy purse seine	0.36	-	-	-	-	-	-
Anchovy falling net	436.93	251.35	-	0.68	3.14	4.48	-
Squid falling net	370.47	-	-	-	-	6.45	-
Squid trap *	29.52	5.29	0.21	7.10	11.59	0.05	-
Fish trap	526.70	1.10	-	322.24	115.36	-	-
Crab trap	1,134.08	-	-	1.66	2.39	0.73	21.66
Short-necked clam dredges	0.46	-	-	-	-	-	-
Mackerel gill net	2,250.92	1,802.14	-	148.21	289.87	2.16	7.03
Sadine gill net	167.99	149.63	-	3.06	0.65	0.97	-
Shrimp trammel net	1,099.39	55.55	-	246.57	93.71	72.62	581.00
Crab gill net	1,571.09	3.79	-	69.88	115.79	7.77	24.83
Other gill net	3,416.50	1,422.59	-	631.39	986.42	202.10	1.93
Handline and pole&line	239.53	5.23	-	204.49	29.81	-	-
Longline	64.89	0.91	-	45.29	18.69	-	-
Other gears	2.30	-	-	-	-	-	2.30
Jelly fish dip net	55,503.00	-	-	-	-	-	-
Push nets	-	-	-	-	-	-	-
Grand total	67,872.86	4,034.10	0.21	1,797.16	1,766.72	485.44	828.31

Data source : Fishery Statistics Analysis and Research Group ; DOF

* nil size sampling gears ** size sampling gear by Ranong, Phuket and Satun Units*** catch of Neritic tuna catch include in sub-total pelagic fish

unit :
ton**Table. 2 Marine capture production of Commercial fishery in the Indian Ocean by fishing gear and fish group year 2017**

Fishing gear	Total	Sub-total Pelagic fish	***Neritic tuna	Sub-total Demersal fish	Other food fish	Trash fish	Sub-total fish&prawn	Sub-total crabs	Sub-total squids	Sub-total shellfish	Sub-total other
Otter board trawl *	86,759	9,137	6***	27,814	14,016	22,823	3,011	2,179	7,371	179	229
Pair trawl	61,458	12,749	-	12,721	12,738	14,457	1,016	1,115	6,565	43	54
Purse seine **	138,318	117,024	12,768***	2,763	11,406	2,697	6	3	4,415	-	4
Anchovy purse seine	2,972	2,761	-	-	37	174	-	-	-	-	-
Anchovy falling net *	15,957	14,847	24***	199	330	401	-	-	180	-	-
Squid falling net *	684	56	4***	-	33	9	-	-	586	-	-
Squid trap	236	0	-	-	8	-	-	-	228	-	-
Fish trap	553	41	-	263	191	-	-	27	1	-	30
Crab trap	219	0	-	12	-	-	3	203	1	-	-
Gill nets	56	49	-	-	5	-	2	-	-	-	-
Longline	167	106	-	38	3	-	-	-	18	-	2
Frog crab trap	765	0	-	-	-	-	-	759	-	-	6
Grand total	308,144	156,770	12,802***	43,810	38,767	40,561	4,038	4,286	19,365	222	325

Data source : Fishery Statistics Analysis and Research Group ; DOF

* nil size sampling gears ** size sampling gear by Ranong, Phuket and Satun Units ***No. of Neritic tuna catch include in sub-total pelagic fish

Table 3 Tuna Longline Port Sampling Activity at Phuket, Thailand from January 2000 to December 2016.

Year	Total no. of landing	Total no. of sampled vessel	% of coverage sampling size	Total catch (mts) from customs *	Total no. of weight samples	Total no. of interview	Total no. of body length measured samples
2000	665	62	9	2,667	29,306	91	4,015
2001	876	230	26	2,493	59,040	44	6,324
2002	816	194	24	2,072	40,458	50	5,513
2003	563	201	36	3,162	44,864	29	3,739
2004	582	152	26	5,197	23,356	36	2,492
2005	517	152	29	5,120	21,502	52	4,760
2006	442	159	36	3,114	16,433	57	3,938
2007	494	56	11	10,114	6,158	-	1,321
2008	533	38	7	7,551	2,512	-	-
2009	521	15	3	6,802	5,366	1	62
2010	575	48	8	9,095	3,926	1	29
2011	375	78	21	5,250	25,823	45	3,191
2012	315	38	12	7,024	8,506	6	1,579
2013	261	14	5	4,923	2,017	-	-
2014	241	-	-	5,846	-	-	-
2015	295	-	-	10,575	-	-	-
2016	204	-	-	6,198	-	-	-
Total	8,275	1,437	17	80,430	289,267	412	36,963

