Data Collection and size sampling on Neritic Tuna Fisheries in Andaman Sea

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Abstract

In the Andaman Sea Coast of Thailand, there are many kinds of fishing gears can catch neritic tuna but most of it were caught by purse seine. The other gears are Otter board trawl, Anchovy falling nets and Squid Falling nets. There are 3 organizations along Andaman sea under Marine Fisheries Research and Development Division responsible to collect the data on fish composition and size distribution, especially for neritic tuna and others importantly economic fish, from more than 10 types of fishing gears. All kind of fishing gears in which both commercial and artisanal fisheries were conducted fisheries data for 3-5 days a month. There are 7 organizations along Andaman sea under Fishing and Fleets Management Division responsible to collected fishing data from logbook and catches landing of marine fish, to recorded and reported the data to Fishing-Info data base. Study on CPUE and MSY were conducted by Fisheries Statistics Analysis and Research Group and Fisheries Resources Assessment Group which are under the Department of Fishery.

The purse seine is the mainly fishing gear for pelagic species. Pair trawls and otter board trawls are the main fishing gears for demersal species. The other gears which have a specific name to target species, such as gill nets, hand line and long line. The target species such as Trevallies, Snappers, Barracudas, Croaker, King mackerel, Sharks and Rays. Especially for data collection on Neritic tuna are collected from the purse seine vessel.

Introduction

In the past 10 years the data collection along the Andaman sea was based on Andaman Sea Fisheries Research and Development Center. After Thailand have Fisheries management plan and Royal Ordinance on Fisheries has Announced, the method and process to collecting the data has reformed, in order to combat IUU fishing and protect the fisheries resources. Thailand is in the process of changing from independent fishery to a system that has more control. The control procedures include: legal framework and enforcement, vessel management, Fishing operation system, Fishing license, Record and reporting of fishery data, fishing vessels, fishing labor, aquaculture trading, Fishing Boats, Employment, Employers, traceability and Catch certificate. After this control has been enforced, fisheries in Thailand has developed to advance step and marine resources have been used sustainably.

Commercial fisheries mean fishing operations using the vessel of a size from 10 gross tonnages or fishing vessel fitted with an engine of a horsepower as prescribed by the minister. Commercial fisheries consist of Trawl nets, Surrounding nets, Fish lift nets or falling nets with light luring, Squid lift nets or falling nets with light luring, Gillnets deep more than 300 mesh, Crap traps surrounding mesh size less than 2.5 inches, Octopus traps more than 2,000 traps per vessel per 1 haul, Dredges. Artisanal fisheries mean fishing operations in coastal zone in which a fishing vessel is used or in which a fishing gear is used without a fishing vessel but in any case, does not include commercial fishing. Artisanal gear such as Hand line, Long line, Red frog crab lift panel, Shrimp dip net. The types of Commercial fishing license along the coast of Thailand have 21 fishing gears. The number of Commercial fishing license registered in Andaman Sea have 2007 vessels, 14 types of fishing gears consist a Hand line, Long line, Red frog crab lift panel, Fish traps, Crab traps, Squid traps, Anchovy falling nets, Squid Falling nets, Purse seine, Anchovy surrounding nets, Gill nets as a nets deep less than 300 mesh, Pair trawls, Otter board trawls and Boat generator. The number of these gears are 2, 15, 31, 15, 24, 63, 134, 84, 268, 44, 9, 192, 485,641 respectively.

Data collection and size sampling in Thailand

DOF Thailand has 4 units responsibility about data collection and size sampling for all off marines and fresh-water fish i.e. 1) Fisheries Statistics Analysis and Research Group in Fisheries Development Policy and Strategy Division 2) Marine Fisheries Research and Development Division 3) Fishing

and Fleets Management Division 4) Fisheries Provincial Office. However, all these units are collecting different data sources and methodology.

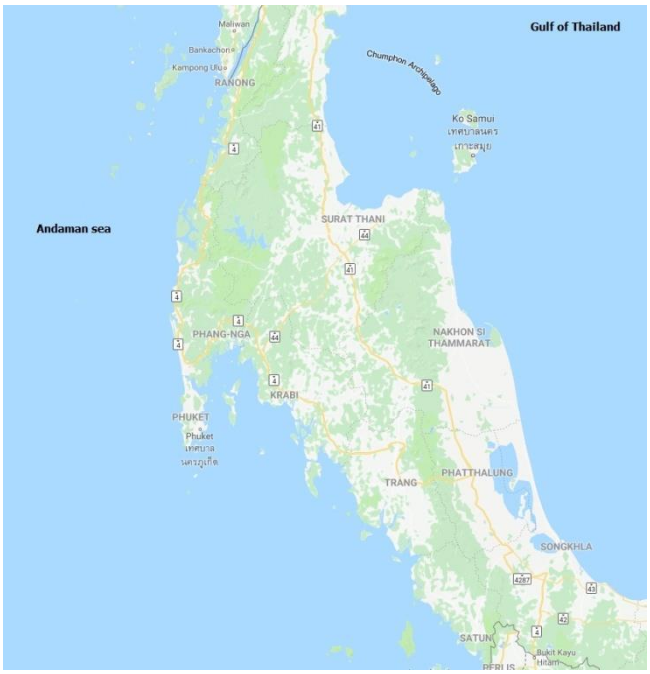

Figure 1 Location site along the Andaman Sea coast of Thailand

1. **Fisheries Statistics Analysis and Research Group** in Fisheries Development Policy and Strategy Division has responded to analyze the statistics of commercial fisheries data result in the captured marine resources and fishing effort. The commercial fisheries are a fishing vessel size more than 10 gross tons that equipped 21 types fishing gears. The method for analyzing the data has 2 parts.

Part I: The data from Port In- Port Out Units. Total catch and fishing effort have analyzed from the vessels that have reported their trips with port in- port out units and also have fishing Logbook. These vessels have size more than 10 gross ton net comprises of 6 fishing gears such as Otter board trawl, pairs trawl, beam trawl, purse seine, anchovy purse seine, and anchovy falling nets. The data also collecting from fishing vessel size more than 30 gross ton net from every fishing gears.

Part II: Use Sampling data. Total catch and fishing effort are estimated from sampling method. Sampling method choose 10 percent from fishing vessel size 10 to 30 gross ton net that nil report to Port In – Port Out units and also have commercial fishing license in year 2017, i.e. Otter board trawls, Pair trawls, Beam trawls, Purse seine, Anchovy surrounding nets, Anchovy falling nets, Squid Falling nets, Pomfret lift nets, Anchovy lift nets, Squid traps, Octopus traps, Fish traps, Crab traps, Short-necked clam dredges,

Other dredges, Gill nets as a nets deep less than 300 mesh, Long line length more than 100 meters, Hand line, Push nets and Red frog crab lift panel.
Sampling Frame: Fishing vessel registered in fishing year 2017 by type of fishing gears.
Survey Method: Sampling from every sampling units in each of fishing gears. Sampling units include vessels, fishing gears and fishing labor.
Sampling Method: Stratified Random Sampling. The strata are fishing gears and vessel size. Sampling 10% in each of fishing gears by province.

Data from 2 parts will be analyzed and published by Fisheries Development Policy and Strategy Division

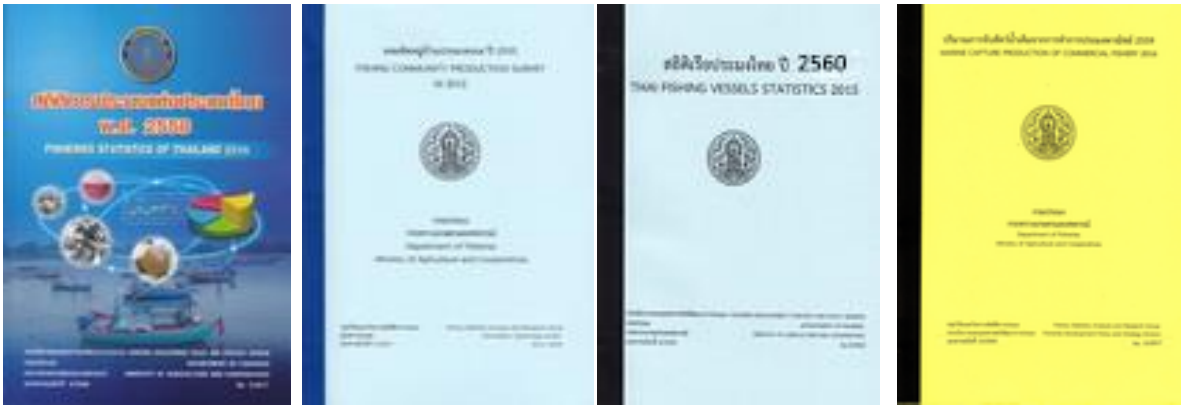

Figure 2 Published by Fishery Statistics Analysis and Research Group, Fisheries Development Policy and Strategy Division, DOF

2. **Marine Fisheries Research and Development Division** (MFRD) has 4 units concern with data collection and size sampling on neritic tuna along the coast of Andaman sea. The first one is the Fisheries Resources Assessment Group located in Bangkok. The other located along the Andaman Sea. All of these have a responsibility in collecting data, doing research and fisheries resources assessment in Thai waters. The collection method is sampling program by type of fishing gear.

2.1 Fisheries Resources Assessment Group, one of units under the Marine Fisheries Research and Development Division. Fisheries Resources Assessment Group has a responsibility to determine the frame of species, size, quantity, season time for proper fishing, fishing license practices, and assessment with the maximum sustainable yield (MSY). Anyway the number of fishing license granted will not exceed the level of permitted Total Allowable Catch (TAC), calculated based on the Maximum Sustainable Yield (MSY).

2.2 Ranong Fisheries Research and Development station has job descriptions and budgets under Upper Andaman Sea Fisheries Research and Development Center (Phuket). This station has responsible for data collection

and size sampling program along the coast of Ranong Province and Kuraburi district in Phangnga province.

2.3 Upper Andaman Sea Fisheries Research and Development Center (Phuket) is located in Phuket province. This center has a responsibility in data collection and size sampling program along the coast of Phangnga Province except Kuraburi district, Phuket province, and Krabi province

2.4 Southern Andaman Sea Fisheries Research and Development Center (Satun) is located in Satun province. This center has a responsibility in data collection and size sampling program along the coast of Trang Province and Satun province.

All off the sampling data from Ranong Fisheries Research and Development station, Upper Andaman Sea Fisheries Research and Development Center (Phuket), and Southern Andaman Sea Fisheries Research and Development Center (Satun) have been sent to Fisheries Resources Assessment Group for data analyze and assess the stock in Andaman Sea, as same as the stock assessment in the Gulf of Thailand.

Figure 3 sampling sites and Fisheries units along the Andaman Sea coast of Thailand.

Ports sampling are collecting size and composition of Marine fish by type of fishing gears. Both of commercial fisheries and artisanal fisheries are collected. Commercial fisheries comprise of purse seine or surrounding nets, trawl nets, fish lift nets, falling nets with light luring, squid lift nets, falling nets with light luring, gill nets deep more than 300 mesh, crab traps surrounding mesh size less than 2.5 inches, octopus traps more than 2,000 traps/vessel/ 1 haul and dredges. Commercial fisheries registered in the Andaman Sea have 14 gears. (See table 1). Size sampling program and data collection have collected for 2-3 days/gear /month. There are more than 6, 24, 13 landing sites were taken for responsibility by Ranong Fisheries Research and Development station, Upper Andaman Sea Fisheries Research and Development Center (Phuket), and Southern Andaman Sea Fisheries Research and Development Center (Satun) respectively.

Table 1 Number of Fishing vessel registered in Andaman Sea year 2017

Fishing gear	Number of Fishing vessel
Otter board trawl *	485
Pair trawl	192
Purse seine **	268
Anchovy purse seine	44
Anchovy falling net *	134
Squid falling net *	84
Squid trap	63
Fish trap	15
Crab trap	24
Gill nets	9
Long line	15
Frog crab trap	31
Hand line	2
Boat generator	641
Grand total	2007

Data source : Fishery Statistics Analysis and Research Group ; DOF

Sampling weight was not less than 30 kgs/vessel, to identify species and measure the length by using punching paper (centimeter) and weight (gram) (Figure 4). Marine Fisheries Division was assigned to collect the data of local purse seine fishing, catch composition, length and weight measurement (Neritic tuna and Torpedo scad measure fork length). There are 16 target species such as Indian mackerel (*Rastrelliger kanagurta*), Short mackerel (*Rastrelliger brachysoma*), Japanese scad (*Decapterus maruadsi*), Shortfin scad (*Decapterus macrosoma*), Bigeye scad (*Selar crumenophthalmus*), Oxeye scad (*Selar boops*), Yellowtail scad (*Atule mate*), Yellowstripe scad (*Selaroides leptolepis*), Torpedo scad (*Megalaspis cordyla*), Goldstripe sardinella (*Sardinella gibbosa*), Kawakawa (*Euthynnus affinis*), Bullet tuna (*Auxis rochei*), Frigate tuna (*Auxis thazard*), Longtail tuna (*Thunnus tonggol*), Indo-Pacific king mackerel (*Scomberomorus guttatus*) and Narrow-barred Spanish mackerel (*Scomberomorus commersoni*).

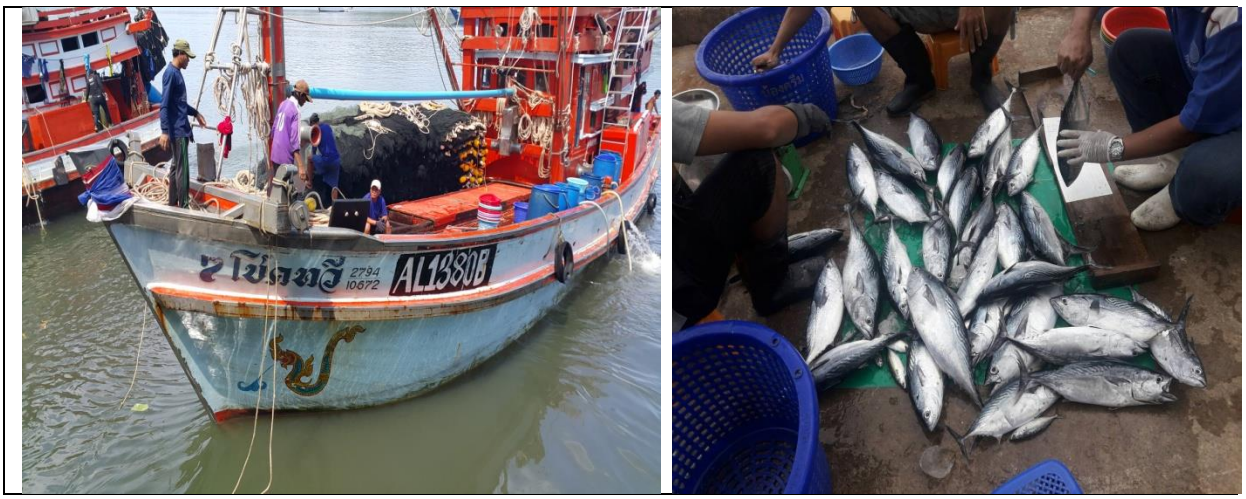

Figure 4 Fishing vessel and size sampling at landing place

In 2017, there were 12,802 tons of Neritic tuna caught by 4 fishing gears. The main gear was Purse seine caught 12,768 tons while Anchovy falling net, Otter board Trawl, and Squid falling nets caught 24, 6 and 4 tons respectively. Anyway, to study on the length distribution of neritic tuna was done only for purse seine. In part of, Anchovy falling net, Otter board Trawl, and Squid falling nets, there was nil data during the sampling periods.

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

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

3. **The Provincial Fisheries Office** in 77 provinces have a duty to collect data from Artisanal fisheries and from fishing vessel size 10 to 30 gross ton net, and reports to Port In – Port Out units every month. Besides, those data will be sent back to Fishery Statistics Analysis and Research Group to analyze later. The data collections include marine fisheries, inland fisheries, type of fishing gear, amount and value of target species, commercial fisheries, small-scale fisheries, processing industries, marine and inland aquaculture.

The Provincial Fisheries officer will interview the fishing master or owner of fishing vessel about catch and sale composition and they sometimes have asked for a copy of sell slips as well. In addition, another task of Provincial Fisheries Office is to serve a fisher as a fishing vessel register service unit. The number of registered vessels will be sent to Fishery Statistics Analysis and Research Group every year.

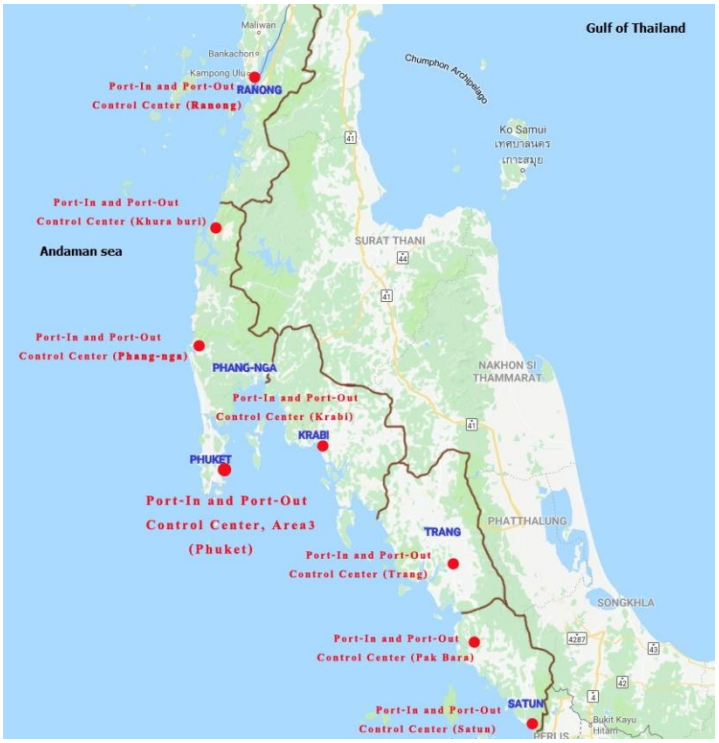

Figure 5 PIPO control center along coast of Andaman Sea.

4. Port In and Port Out Control Center, Area 3 (Phuket) (PIPO-Phuket) in Fishing and Fleets Management Division. There are 7 units under Port In and Port Out Control Center, Area 3 (Phuket) along the Andaman Sea. The first one, the northern unit is Port In and Port Out Control Center (Ranong) located in Ranong province, second is Port In and Port Out Control Center (Khuraburi) located in Khuraburi district, Phangnga province, third is Port In and Port Out Control Center (Phangnga) located in Tablamu sub-district in Phangnga province, the fourth unit to the seventh unit were located in Krabi province, Trang province, and 2 Units in Satun province respectively. The

fishing vessel size more than 30 gross ton must report all data to PIPO. PIPO will input the data into “Fishing Info” database. For example, of the data was put in the database, types of fishing gear, types of caught fish, name of vessel, vessel registration, vessel license, fishing license, and crews. Fishing Info is an electronic database which integrates the vessel registration database and fishing license database. Data sources that PIPO collected from fishing vessels include Logbook, Marine Catch Purchasing Document (MCPD), and record of fish unloaded. These units worked under the Rayal Thai Navy and also co-working with another organizations such as 3th Naval Area Command, 5th Marine Office Phuket Branch, Ministry of labour Phuket branch, and Phuket Provincial Labour Protection and Welfare Office .

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