



Technical Consultative Meeting
on Drafting of the Regional Action Plan for Management of Transboundary Species
Rastrelliger Brachysoma in the Gulf of Thailand Sub-region
12-13 September 2019, Chonburi, Thailand

AGENDA 4:

EXISTING SCIENTIFIC KNOWLEDGE OF

R. Brachysoma (Indo-pacific Mackerel/short mackerel)

I. INTRODUCTION

This paper is developed based on the inputs from 6 relevant countries on the transboundary species of *Rastrelliger Brachysoma* in the Gulf of Thailand and the South China sea sub-region. The objective of this paper is to provide the existing scientific and local knowledge and information to manager for consideration and decision on the development of the Regional Action Plan for management of this transboundary species in the sub-regions.

II. GENERAL INFORMATION AND CHARACTERISTICS

The Short Mackerel is a species of mackerel in the family Scombridae. It is known by some other names such as Shortbodied Mackerel, Maquereau Trapu (French), Caballa Rechoncha (Spanish), *Rastrelliger brachysoma* (scientific name) and Pla thu (Thai). It is mainly found in the shallow waters of Southeast Asia and Melanesia. And the fish is of major importance in the fisheries industry. This species is pelagic and oceanodromous and is found in estuarine habitats with slightly reduced salinities and in areas where surface temperature range between 20–30°C. It forms schools of equally sized individuals, and feeds chiefly on microzooplankton with a high phytoplankton component.

Catches of the Short Mackerel are generally either recorded as *Rastrelliger spp.* or combined with *R. kanagurta*. This fish species is the most important commercial species of mackerel in the Philippines. It is caught throughout the year with native purse seines and fish corrals in Manila Bay. In addition, This species is also importance in Thailand, Cambodia, Indonesia, Malaysia and Viet Nam. The Short Mackerel is generally sold at market at low prices. But it is a very good source of protein. And it is popular as food in it's native area.



Conservation Status



The Short Mackerel has a very deep body. It is generally of silver color, with somewhat pointed snout. Their dorsal fin is yellowish with black edge, the pectoral and pelvic fins are dusky and other fins are yellowish.

Their head is about equal to or less than their body depth. Average body length of the Short Mackerel is around 20 cm, with a maximum length of 34.5 cm. Length at 50% maturity ranges from 15–18 cm fork length (FL) (Sudjastani 1974, Isa 1986, Pairoh 1987), and has an estimated longevity of at least two years (Tandog-Edralin 1988, Isa 1986, Pairoh 1987).

III. STOCK/POPULATION

CAMBODIA:

In 2018, the total catch of mackerels is 2, 984 ton in Cambodia. There are four stocks of *R. Brachysoma* in the Gulf of Thailand, i.e. Eastern, Upper, Central and Lower stocks. The genetic analysis results focused in the Trat province in Thailand where border to Cambodia showed that *R. Brachysoma* harvested off Trat province consisted of 42.48% from Cambodia, 35.63% from Malaysia and 3.86% from Viet Nam, and 18% from Thai waters.

INDONESIA:

Based on Marine Affairs and Fisheries Ministerial Decree No. 50 Year 2017, there is an estimation stock potency for small pelagic fish (does not specifically mentioned for *R. Brachysoma*) in Malacca Strait and Andaman Sea (those waters are grouped in Fisheries Management Zone [FMZ] 572) as amount as 99.865 tons with allowable catch 79.892 tons, and utilization rate 0.83 (categorized as fully-exploited). Suman et al, 2018, in Jurnal Kebijakan Perikanan Indonesia, mentioned that the fish stock for all species in FMZ 571 as amount as 425.444 tons in 2016.

MALAYSIA:

Population from Tumpat, was genetically close to the mackerel from Pattani according to the close geographical distance between the sampling localities (2018).

PHILIPPINES:

The Indo-pacific mackerel registered a total production of 31.17 thousand metric tons in 2018. It was 12.25 percent short of its 2017 performance of 35.52 thousand metric tons.

TABLE 2 Volume of Fisheries Production by Species: Philippines, 2016 - 2018

Species	Volume of Production (metric tons)			Percent Change		% Point
	2016	2017	2018	2017/2016	2018/2017	Contribution
Fisheries	4,355,792.42	4,312,089.51	4,351,892.60	(1.00)	0.92	0.92
Milkfish	402,655.07	416,363.17	400,118.78	3.40	(3.90)	(0.38)
Tilapia	300,722.50	310,974.80	321,076.58	3.41	3.25	0.23
Tiger prawn	49,254.50	46,157.00	44,884.45	(6.29)	(2.76)	(0.03)
Roundscad (Galunggong)	211,776.50	183,077.67	168,148.04	(13.55)	(8.15)	(0.35)
Skipjack (Gulyasan)	220,108.99	247,593.66	258,316.72	12.49	4.33	0.25
Yellowfin tuna (Tambakol/Bariles)	103,037.15	106,920.07	94,183.45	3.77	(11.91)	(0.29)
Seaweed	1,404,519.23	1,415,320.79	1,478,300.85	0.77	4.45	1.46
Frigate tuna (Tulingan)	133,886.39	122,074.67	111,755.82	(8.82)	(8.45)	(0.24)
Indian sardines (Tamban)	280,472.75	241,477.37	257,634.84	(13.90)	6.69	0.37
Big-eyed scad (Matangbaka)	112,826.16	109,203.03	110,724.31	(3.21)	1.39	0.04
Indian mackerel (Alumahan)	63,320.00	60,071.23	55,705.17	(5.13)	(7.27)	(0.10)
Squid (Pusit)	52,118.54	49,898.73	47,031.16	(4.26)	(5.75)	(0.07)
Mudcrab	17,845.72	18,997.85	21,678.67	6.46	14.11	0.06
Threadfin bream (Bisugo)	39,682.28	39,598.35	36,507.14	(0.21)	(7.81)	(0.07)
Fimbriated sardines (Tunsoy)	76,585.73	79,421.79	88,270.48	3.70	11.14	0.20
Anchovies (Dilis)	55,760.61	50,174.37	48,734.48	(10.02)	(2.87)	(0.03)
Indo-pacific mackerel (Hasa-hasa)	38,338.79	35,518.34	31,167.97	(7.36)	(12.25)	(0.10)
Blue crab (Alimasag)	28,616.74	31,327.61	33,963.01	9.47	8.41	0.06
Eastern little tuna (Bonito)	36,918.06	37,090.00	36,562.73	0.47	(1.42)	(0.01)
Grouper (Lapu-lapu)	17,881.70	17,482.65	17,798.63	(2.23)	1.81	0.01

Reference: Fisheries Situation Report January to December 2018 ISSN 2012-0400

THAILAND:

- **2016** > MSY =96,455 Tonnes at fishing effort 78,680 days
- Actual fishing status point =24,328 Tonnes at fishing effort 237,679 days
- **Fishing effort over = 66.90%**
- **2017** > MSY =123,515 Tonnes at fishing effort 58,906 days
- Actual fishing status point =12,310 Tonnes at fishing effort 208,079 days
- **Fishing effort over = 71.74%**

VIET NAM:

In the south western of Viet Nam, the length at first maturity for female, *R. Brachysoma* was 152,3 mm while for male was 163,2 mm. Normal length ranged from 160mm - 200mm. Sex ratio between male and female in stock is 1:1.4

IV. FISHERIES STATUS

CAMBODIA:

In Cambodia, the catch of mackerels had increased from 1,000 ton to 4650 ton from 1990 to 2006. In Sihanouk Province of Cambodia, there are two high catch peaks, i.e. first one in January and February; and second peak in July, September, and October. The Indo Pacific Mackerel catch composition was 86% of the total pelagic catch based on data in 2003-2004. In Kampot Province, the high peak catch is in May, June, July and September. The catch composition was 63% of the total pelagic catch in 2004. Mackerel is not only sold on the domestic market but is also exported to neighboring country both fresh and processed.

INDONESIA:

Suwarso et al, 2010 reported that small pelagic fish is a dominant catch fish species in South China Sea (in between Riau Archipelagoes waters and Kalimantan) with a vital decreasing rate of catch per years. Suwarso et al, 2015, BAWAL journal Vol. 7, reported that there is a shift of changing in catching areas due to decreased catch volume per years in Northern Java Sea, Indonesia. Most of the FMZs in Indonesia are in fully exploited and over-exploited status on small pelagic catch. The most critical condition is on FMZ 571 (Malacca Strait and Andaman Sea)

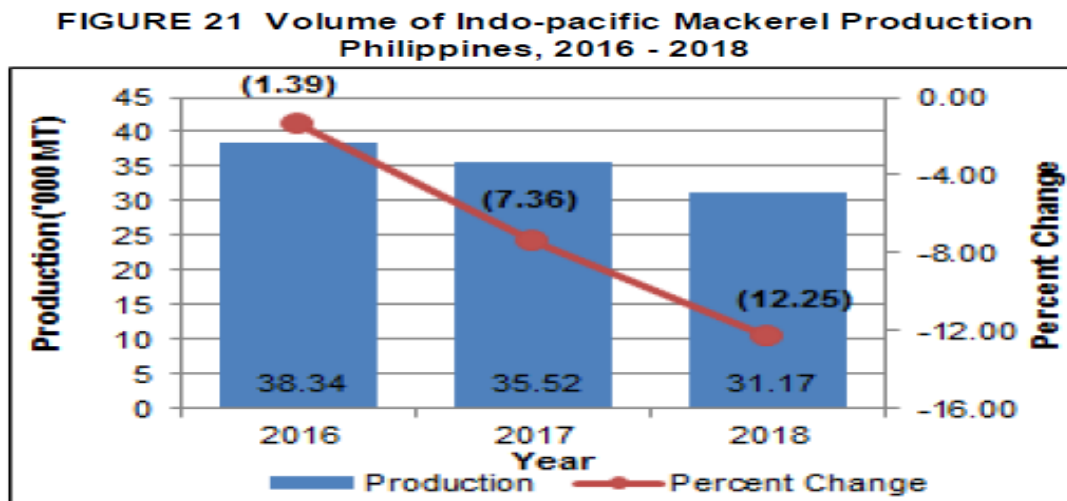
MALAYSIA:

- During 2009-2015, the highest quantities of mackerel were recorded in Zone A in Kelantan and Pahang, and Zone B in Terengganu and East Johor (2016).
- small pelagic species in the east coast of Peninsular Malaysian waters are still under-exploited and sustainable which includes the Indo-Pacific mackerel (2016)
- Stable for Sustainable harvest level in the east coast of Peninsular Malaysian waters.
- The main gears used are gill nets/drift nets and purse seines and their catch is landed in the States of Kelantan, Terengganu, Pahang, and East Johor. During 2009-2015, the highest quantities of mackerel were recorded in Zone A in Kelantan and Pahang, and Zone B in Terengganu and East Johor.

State	Total Catch (MT)	Average MT/Y	Gear types (%of ctach)	% of species catch according to fishing zone for 7 years (2009-2015) A (0-5 nm), B (5-12 nm), C (12-30 nm) and C2 (>30 nm)
Kelantan	941.87	134.55	Gill/drift net (7.3%) Trawler (25%) Handline (2%)	A= 74.70 B=6.62 C= 10.81 C2=7.87
Teranganu	262.15	37.45	Purse seine (44%) Trawler (36%) Gill/drift net(18%) Handline (2%)	A= 20.55 B=71.51 C= 3.37 C2=4.57
Pahang	4336.03	619.43	Gill/drift net(90%) Trawler (6%) Purse seine (3%) Others (1%)	A= 90.79 B=2.99 C= 2.13 C2=4.09
East Johor	114.99	16.41	Trawler (78%) Gill/drift net(21%) Purse seine (1%)	A= 20.67 B=44.89 C= 33.86 C2=0.58

PHILIPPINES:

Volume of catch continuously went down for the past three years. From a 7.36 percent drop in 2017, a higher decrease of 12.25 percent was observed in 2018. Of the total catch in 2018, 65.85 percent were unloaded in municipal fish landing centers and the rest in commercial fish landing centers. The volume of catch of indo-pacific mackerel was almost equally distributed quarterly. However, the volume was relatively higher during second and fourth quarters which represented 27.20 and 26.53 percent of the total output in 2018, respectively. Drop in production was observed in all quarters of 2018. Double digit increments of 13.51 and 17.29 percent during the second and third quarters sealed the low output in 2018, respectively.



Reference: Fisheries Situation Report January to December 2018 ISSN 2012-0400

THAILAND:

3 Main fishing gears: Purse seine 75%, Indo Pacific Mackerel encircling gill net 19 %, Indo Pacific Mackerel gill net 3%, and Other < 1%. Total catch of Indo Pacific Mackerel is decreasing trend during 2015 – 2018.

VIET NAM:

In the southwest monsoon (from May to October), the total biomass estimated at 264 thousand tons, and the total allowable catch (TAC) 106 thousand tons (Nghia *et al.*, 2007. RIMF). In addition, In the northeast monsoon (from November to April the following year), the mackerel species biomass about 169 thousand tons and TAC: 87 thousand tons (Nghia *et al.*, 2007. RIMF).

V. MAPPING AND HABITAT LINKAGES, SPAWNING, NURSERY GROUNDS

CAMBODIA:

- The major fishing areas of mackerel in Cambodia including Koh Rong, Koh Thas, Koh Roeusey, KohTakiev, Koh Thmey, Koh Ses and other small islands archipelago and in Kampong Som bay inshore and offshore such as Koh Rong Sanlem, Koh Tang, Koh Pring and Koh Poulowai archipelagoes. During rainy season, this species is caught in inshore area such as near Koh Daekol, Koh Pours, Koh Thas, in front of Thmorsor and Stoeung Hav areas in Preah Sihanouk province by trawlers and caught by gillnets, push nets and small trawlers which operating near shore in Kampot and Kep provinces.
- Cambodia's offshore waters are considered as important spawning and nursing grounds for regional stocks of Indo Pacific mackerel. The spawning of this species may occur throughout the year with peaks of spawning from February to May. Males were slightly more abundant than females. The processors of steamed mackerel fish in Preah Sihanouk province observe that during Jan-Apr the steamed fish always break its belly because egg is bigger and this period is not good for this processing.

INDONESIA:

- The distribution of the species in Indonesia is largely concentrated in coastal waters of Kalimantan, West Sumatra, Java Sea, Malacca Strait, South-east Sulawesi (District Muna - Buton) and Arafura Sea (dunia-perairan.com).
- Based on Suwarso et al, 2015, Jurnal Kebijakan Perikanan Indonesia, the spawning season for the species is estimated on October to November in Northern Java Sea.
- Jannati et al, 2016, <https://repository.ipb.ac.id/handle/123456789/86212> mentioned that spawning season of the species in Sunda Strait is estimated on April as a start, and August as the peak.

MALAYSIA:

Require the element for resource mapping for management; comprising for spawning ground, nursing ground and fishing ground and identification of egg and larvae hotspots.

PHILIPPINES:

- Known Critical Spawning and Nursery Areas for Significant Fish Species in the Philippines: Short mackerel (*Rastrelliger brachysoma*)
 1. Lingayen Gulf 16°12'42" – 120°08'17"
 2. Batangas Coast 13°39'N – 120°44'E
- Species of transboundary significance and their recorded occurrences in waters of the South China Sea side of the Philippines: Short mackerel (*Rastrelliger brachysoma*)*
 1. Bauang,
 2. La Union;
 3. Manila Bay;
 4. Calapan, Mindoro

*Reference: Barut, Noel. NATIONAL REPORT on The Fish Stocks and Habitats of Regional, Global, and Transboundary Significance in the South China Sea PHILIPPINES. National Fisheries Research and Development Institute. Department of Agriculture. 940 Kayumanggi Press Building, Quezon Avenue, Quezon City 1103, Philippines

- Key spawning areas (ichthyoplankton) in South China Sea** are:
 - (a) Malampaya Sound;
 - (b). the western portion of Lingayen Gulf;
 - (c). Mindoro Strait; and
 - (d). Northern Palawan including the Calamianes Islands.

It is also believed that Scarborough Shoal and the Kalayaan Island Group are major sources of propagules for the country's archipelagic waters and fishing grounds, although comparable information (e.g. ichthyoplankton) for use in undertaking a more definitive examination are lacking.

**Reference: <https://fisheries-refugia.org/philippines-background/93-refugia-country-activities/philippines/background-philippines/161-known-areas-philippines>

- Locations on the South China Sea Coast of the Philippines that important pelagic species utilize for spawning (compiled by Mr. Noel Barut, Fisheries Focal Point for the Philippines)

Country	Geographical Location	Important Pelagic Species that Utilise the Area for Spawning	Fishing Gears and Practices Used in the Area	Existing Fisheries Management Measures in the Area
Philippines	Busuanga, Coron, Culion and Tayaty Palawan; along South China Sea	Sharks, rays, garfish, hemiramphus, mackerels, scads, belonidae, salmon, fusiliers, sardines, milkfish, garfish, herrings, penaeid shrimps, rabbitfish, mullet, anchovies, carangidae families, scombroids; hawksbill & green sea turtle; bottlenose & irrawady dolphin, sea cow		Marine reserve Marine park
Philippines	Mabini and San Juan, Batangas; South China Sea	Anchovy, jacks, mackerels, tunas, dogtooth and yellowfin tuna, rays, remora, sailfish, flying fish, halfbeak, herring, sardines, salmon, golden trevally, barracuda, fusiliers		Marine reserve Marine park
Philippines	Bolinao and Anda, Pangasinan; along South China Sea	Anchovies, herrings, sardines, salmon, tuna, rays, sharks, sailfish, fusiliers, barracuda		Marine reserve Marine park

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THAILAND:

- The populations are genetically different to each other in moderate level.
- Mixed Stock Analysis (MSA) , Samut Songkhram 42.81%, Trat 34.38%, Surat Thani 21.60%, Prachuap Khiri Khan 1.21%
- The life cycle; Distribution - along the coastal, less than 50 m. depth. Spawning season – all year and Spawning grounds – the middle of the GoT (off Prachuap KiriKhan, Chumphon and Surat Thani provinces.
- Gravid fish move from the inner Gulf to spawn in the middle Gulf.
- Fertilized eggs float in areas of 20-30 m. in depth.
- Juveniles move to the inner Gulf.

VIET NAM:

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VI. EXISTING LEGAL/MANAGEMENT MEASURES

CAMBODIA:

- Mackerels catching is banned from 15 January to 31 March of each year according to Fisheries Law of Cambodia

INDONESIA:

- Law No. 31 Year 2004 on Fisheries, a law in governing the fisheries sector within its all aspects.
- Marine Affairs and Fisheries Ministerial Regulation No. 18 Year 2014 for Fisheries Management Zone governs the management of the fisheries zone in Indonesia.
- Marine Affairs and Fisheries Ministerial Decree No. 50 Year 2017 for allowable catch and rate of utilization to all commercially recognized species (not specifically mentioned the species - *Rastrelliger Brachysoma*).
- Trade Ministerial Regulation No. 66 Year 2018 on Fisheries Import Requirements governs the arrangement on importing fish and its product (not specifically mentioned the species).
- No specific regulation under Ministerial decree or regulation on the species.

MALAYSIA:

- Prohibiting the use of some commercial gears during the closed season and protecting the nursery ground by enforcement.

- While management measures are in place for local mackerel stock, there is none for the transboundary stocks as much information is still needed to confirm.

PHILIPPINES:

- DA-DILG JAO Order No. 2, s. 2014 - Establishing a closed season for the conservation of small pelagic in Davao Gulf.
- FAO No. 167 – Establishing of closed season for the conservation of sardines, herrings and mackerels in the Visayan Sea.
- Reference: <https://www.bfar.da.gov.ph/LAW>

THAILAND:

- Closed season
- Closed area
- During 15Feb-15May to conserve gravid fish and juveniles in the Gulf of Thailand.
- Control Fishing licenses, Fishing zone, and Gear restriction

VIET NAM:

- Indo-Pacific mackerel together with continued links to existing cooperation transboundary species among Gulf of Thailand countries.
- Existing data/information in support of improved understanding of stock status as well as to provide the basis for appropriate fisheries management measures (focus on fishing effort regulation).
- Fisheries Laws (2003)
- Strategy and Master Plan for Sustainable Fisheries Development to 2020 approved by the Government (2013).
- NPOA of IUU and Fishing Capacity Management are being drafted.
- Viet Nam became a Cooperating Non-Member of WCPFC since 2009 and thus legal and policy arrangements have also being reviewed in the light of WCPFC's requirements.
- UNCLOS ratified by Vietnamese Government in 1994 is used as basis for fisheries management arrangements.
- Member of RPOA