

Malaysia had been consistent at about 10,000-20,000 metric tons during the same period.

In terms of value, round scads caught from the South China Sea seemed to command higher prices than those caught from the Andaman Sea (Table 53). The highest value of total scads production was recorded in the Philippines in 2013 at US\$ 396,602 while the lowest value was recorded in the West Coast of Peninsular Malaysia in 2000 at US\$ 5,117.

1.1.3 Mackerels

Mackerels (Family Scombridae) are also among the most economically important small pelagic fishes in the Southeast Asian region contributing about 38% to the small pelagic fisheries production or 11% to the total capture fisheries production in 2010 as shown in Table 54.

Mackerels are more predominantly caught in the Andaman Sea than in the South China Sea. As shown in Figure 49, higher catch was recorded in the Andaman Sea compared to that of the South China Sea. Although the catch from the Andaman Sea and South China Sea increased in 2010,

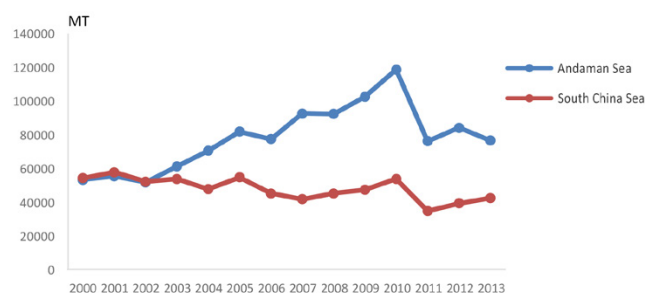


Figure 49. Production of mackerels from the South China Sea and Andaman Sea in 2000-2013

Source: SEAFDEC (2002-2013); SEAFDEC/MFRDMD (2000); SEAFDEC/MFRDMD (2015a); and Department of Fisheries Malaysia (2000-2014)

Table 53. Value of total production of round scads from different fishing grounds of the Southeast Asian countries from 2000 to 2014 (US\$ thousands)

Year	Indonesia ¹		Malaysia ²		Philippines ¹ (SCS)	Thailand ¹	
	Natuna Sea (SCS)	Malacca Strait (AS)	West Coast (AS)	East Coast+SS+LB (SCS)		Gulf of Thailand (SCS)	Indian Ocean (AS)
2000	...	...	5,117	79,086	...	67,857 ³	24,559 ³
2001	...	...	5,881	71,583	...	...	...
2002	109,925	27,481	15,474	74,827	...	31,152	14,211
2003	108,094	27,023	22,287	56,811	...	36,206	15,889
2004	115,094	28,773	23,477	43,814	...	42,537	19,764
2005	132,878	33,219	26,331	54,619	...	42,506	19,749
2006	145,106	36,277	33,311	60,666	...	45,163	20,984
2007	153,949	38,487	34,467	55,492	...	26,859	13,780
2008	165,073	37,483	38,975	61,804	315,179	22,224	...
2009	29,321	5,239	33,444	77,125	262,969	22,532	...
2010	238,363	37,482	38,442	63,112	306,314	...	25,517
2011	323,502	...	30,211	77,307	317,185	24,801	...
2012	213,536	13,018	22,801	79,988	343,895	29,761	...
2013	314,315	28,967	23,442	84,334	396,602	...	29,027
2014	...	...	29,796	72,848	...	...	...

SCS: South China Sea; AS: Andaman Sea; SS: Sabah-Sarawak; LB: Labuan; ... = not available
 Source: ¹SEAFDEC (2002-2013); ²Department of Fisheries Malaysia (2000-2014); and ³SEAFDEC/MFRDMD (2000)

Table 54. Percentage of mackerels in small pelagic fisheries production and total capture fisheries production of the Southeast Asian countries in 2010

	Brunei Darussalam	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam	Average
% of mackerels catch in total capture fisheries production	17	...	13	19	...	19	2	4	...	11
% of mackerels catch in total small pelagic production	75	...	53	71	...	74	41	17	...	38

... = data not available

Source: Tagging program for economically important small pelagic species in the South China Sea and the Andaman Sea, Regional Project Terminal Report (Mazalina and Katoh, 2014)

Table 55. Production of mackerels from different fishing grounds of the Southeast Asian countries in 2010 by quantity (metric tons: MT)

Fishing grounds	Country	Total capture fisheries production (MT)	Production of small pelagic fishes (MT)	Production of mackerels (MT)
South China Sea	Brunei Darussalam	2,304	536	230
	Cambodia	85,000	NA	NA
	Indonesia (Natuna Sea)	3,757,030	771,023	218,625
	Malaysia (ECPM+SS+LB)	695,495	144,750	32,031
	Philippines	2,279,732	569,649	149,100
	Singapore	1,731	98	N/A
	Thailand	36,277	33,311	60,666
	(Gulf of Thailand)	990,607	213,140	13,759
	Viet Nam	2,226,600	NA	NA
Total		10,038,499	1,717,196	413,745
Andaman Sea	Indonesia (Indian Ocean)	1,276,883	241,488	75,284
	Malaysia (WCPM)	733,383	213,766	154,194
	Myanmar	2,048,590	51,543	26,490
	Thailand (Indian Ocean)	628,346	120,225	17,011
	Total		4,687,202	102,476	272,979

ECPM: East Coast Peninsular Malaysia; *WCPM*: West Coast Peninsular Malaysia; *SS*: Sabah-Sarawak; *LB*: Labuan; ... = data not available

Source: Tagging Program for Economically Important Small Pelagic Fishes in the South China Sea and the Andaman Sea: Regional Project Terminal Report (Mazalina and Katoh, 2014)

it decreased in 2011, which could be influenced by the trends of catch of Indonesia and Philippines as the main producers of mackerels (**Table 55**).

As mentioned earlier, Indonesia and Philippines are the major contributors to the region's total mackerel production, followed by Malaysia and Thailand (**Table 55**). The Fisheries Statistical Bulletin of Southeast Asia 2012 (SEAFDEC, 2014) reported that the highest catch of mackerels was recorded in Indonesia and Philippines at 3,757,030 metric tons and 2,279,732 metric tons,

respectively. Meanwhile, the lowest catch of mackerels was recorded in Brunei Darussalam with 230 metric tons.

Mackerels are caught by various types of fishing gears in the Southeast Asian waters and the three major types are purse seines, trawls, and driftnets. Purse seines and trawls are used more offshore than driftnets. In the Andaman Sea, mackerels are caught mostly by purse seines (43%) followed by drift/gill nets (37%) and trawls (20%); with landing trends that are constantly increasing (**Figure 50**). Purse seiners in Andaman Sea generally use FADs and luring lights, catching more Indian mackerels (*Rastrelliger kanagartha*) than short mackerels (*R. brachysoma*).

Meanwhile, in the South China Sea, mackerels are caught by purse seines accounting for about 45% of the total catch in 2008, followed by drift/gill nets at 31%, trawls at 18%, and others at 6% (**Figure 51**). The landings show declining trends indicating that the mackerel stocks in the South China Sea are already overexploited. For species composition of purse seine catch, Indian mackerels made up about 25% of the total catch while short mackerels account for only 2%.

The study conducted by Bidin and Kassim (2007) estimated that the average exploitation rates (E) for *R. kanagartha* is at 0.69 from 2002 to 2006 in four countries bordering the South China Sea. This higher E value was also recorded for *R. brachysoma* in a study done in Malaysia and Philippines with average exploitation rate of 0.66. It could be concluded that the mackerel resources in the South China Sea during the study period are already overexploited.

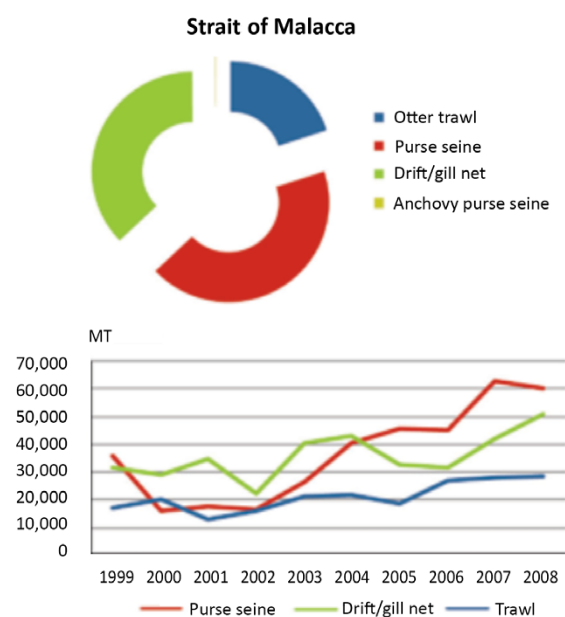


Figure 50. Composition (*above*) and trends (*below*) of mackerel catch by main gear types in the Strait of Malacca (Andaman Sea) in 2007 by quantity

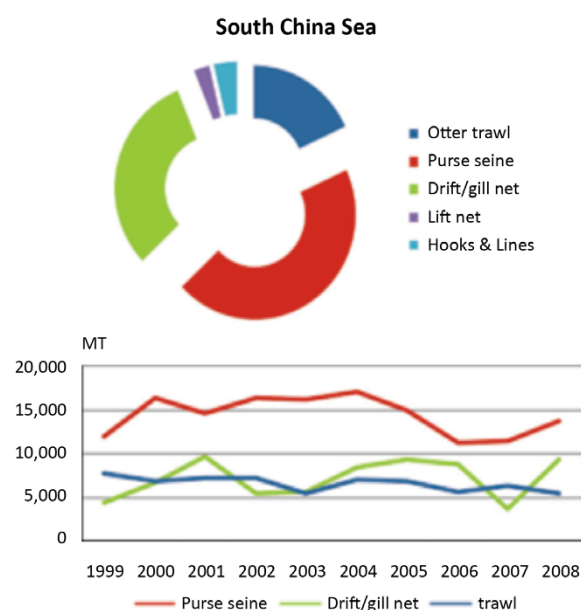


Figure 51. Percentage of production of major types of fishing gears used for catching mackerels in the South China Sea in 2008 (above), and trends of production of major types of fishing gears used for catching mackerels in the South China Sea in 1999-2008 (below) by quantity

1.1.4 Anchovies

Anchovies (Family Engraulidae), like other small pelagic fishes, are widely distributed in the Southeast Asian region. Anchovies are found in the neritic zone or shallow coastal waters. Anchovies mainly feed on planktonic crustaceans. Their breeding period is throughout the year with peaks during the first part of northeast monsoon from October to January in Manila Bay, and from February to April and July to December in the Gulf of Thailand (SEAFDEC, 2012b). Shorthead anchovy (*Engraulis heteroloba*) and Indian anchovy (*Stolephorus indicus*) are the two dominant species found in the Southeast Asian region. In this region, anchovies are caught mainly by purse seine operating during day time, while purse seine using luring lights, bamboo stake traps, luring light lift-nets, set bag nets, stationary traps, push nets, and trawl nets are operated during night time. Fishing grounds are located in the South China Sea and Andaman Sea, and stocks of anchovies are believed to be transboundary in the Southeast Asian

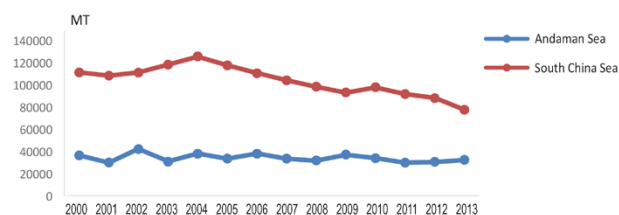


Figure 52. Total catch of anchovies from the South China Sea and Andaman Sea by quantity from 2000-2013

Source: SEAFDEC (2002-2013); SEAFDEC/MFRDMD (2000); SEAFDEC/MFRDMD (2015a); and Department of Fisheries Malaysia (2000-2014)

waters; however, information on its status as shared stocks is limited.

In comparing the production trends of anchovies from 2000 to 2013 between the two fishing grounds, it was found that the South China Sea had higher production compared to the Andaman Sea (Figure 52). While the production trend in the South China Sea was gradually decreasing, the production trend in Andaman Sea seemed to be stable and consistent. Indonesia, Malaysia, Philippines, Singapore, and Thailand are the countries that catch anchovies in the South China Sea. On the other hand, the countries fishing for anchovies in the Andaman Sea are Indonesia, Malaysia, Myanmar, and Thailand.

The trends of the production values were also compared between the two fishing grounds. While the trend of the production values from the South China Sea fluctuated but gradually increased, in the Andaman Sea, the values appeared to be stable and consistent (Figure 53). The highest production value was observed in the South China Sea in 2011 at US\$ 474,253 and the lowest production value recorded in 2003 in the Andaman Sea was estimated at US\$ 16,307.

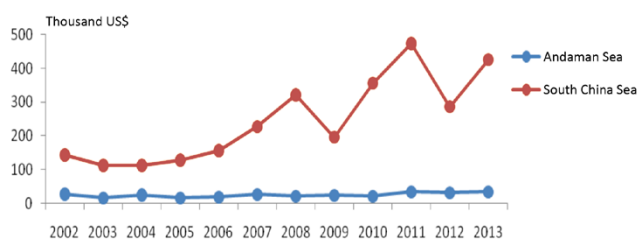


Figure 53. Value of the production of anchovies in the South China Sea and Andaman Sea from 2002 to 2013 (US\$)

Note: South China Sea (SCS) countries: Thailand, Malaysia, Indonesia, Philippines and Singapore
Andaman Sea (AS) countries: Thailand, Malaysia and Indonesia

Source: SEAFDEC (2002-2013)

The annual production of anchovies in the Southeast Asian region is compiled based on available information contributed by six member countries, namely: Indonesia, Malaysia, Myanmar, Philippines, Singapore, and Thailand. Since 2002, Indonesia dominated the highest landings, followed by Thailand, Philippines, and Malaysia (Table 56). Meanwhile, Singapore and Myanmar recorded the lowest production of anchovies. The highest production (207,450 metric tons) was observed in Indonesia in 2009 while the lowest production (17 metric tons) was recorded in Singapore in 2005.

In Cambodia, the fishing grounds for anchovies are concentrated around Koh Sdach in Koh Kong, Tomnop Rolok in Preah Sihanouk and Kampong Bay in Kampong (Figure 54).