Ocean and Indian Ocean could be increased. Even so, if the catch of longtail tuna (healthy stock) is increased as suggested, the stock status of kawakawa could be worse because kawakawa and longtail tuna are being exploited by multi-gears and multi-species fisheries in the same ecosystems. Thus, the increase or reduction of catch would be difficult to attain because the gears used in the fisheries could catch the other species with healthy and unhealthy stock status. Therefore, catch reduction strategies should be developed based on the species composition, stock status, fishing seasons, fishing ground, commercial values, and seasonal closures. Each Member Country should consider developing their respective strategies based on their unique situation and factors.

Way Forward

Currently, the activities carried out by the SWG-Neritic Tuna are under the JTF VI Phase 2 Project "Fisheries Management Strategies for Pelagic Fish Resources in the Southeast Asian Region" implemented by SEAFDEC/ MFRDMD. The ongoing project activities include assessment of the stock status of neritic tunas, clarification of the stock structure by molecular methods (genetic study), and life history (otolith) study for neritic tunas in the region. Moreover, the following are the future endeavors of SEAFDEC in collaboration with the AMSs.

- Strengthen the cooperation and coordination with IOTC and WCPFC to avoid duplication of works
- Explore the possibility of organizing training courses on stock assessments of neritic tunas and economically important small pelagic species
- Enhance the knowledge on environmental factors that affect the abundance of neritic tunas and small pelagic species
- Continue the activities under the RPOA-Neritic Tunas focusing on longtail tuna and kawakawa, including the genetic study

1.1.2 Scads

Scads are small pelagic fishes under the family Carangidae, that often have a yellow stripe running from head to the caudal peduncle. Mainly feeding on copepods, scads also consume the larvae of pteropods, ostracods, and gastropods (Pastoral *et al*., 2000). Scads normally inhabit the warm coastal waters usually down to 20 m and are distributed around the Andaman Sea, South China Sea, East China Sea, Gulf of Tonkin, Gulf of Thailand, Strait of Malacca, and Java Sea. In the South China Sea, scads are distributed over the continental shelf but concentrated towards the coastal zone (Albert *et al*., 2003). These species are known as migrating species; thus, it is considered that the stocks are shared, especially from the Gulf of Thailand to Sunda Shelf, Straits of Malacca, Eastern South China Sea, and the Gulf of Tonkin (SEAFDEC, 2017b). Wahidah *et al*. (2013) reported that the population of Japanese scads (*Decapterus maruadsi*) in the South China Sea is partially shared with moderate genetic variation, while Noorul *et al*. (2020) found a genetic homogeneity within the Sundaland region's population (Andaman Sea and South China Sea), including the populations found in Rosario, Philippines, and Ranong, Thailand (Andaman Sea) but with different stock structures to that of the Northern Viet Nam populations (Nghe An and Cat Ba).

Although their value is less than the other pelagic species, scads are among the commercially important marine species (Abu-Talib *et al*., 2013; Ahmadi, 2020). In the region, scads are mainly caught using purse seine, especially in the Gulf of Thailand (SEAFDEC, 2014). The types of purse seine are either with the use of luring light in Thailand or fish aggregating devices (FADs) in the Philippines and East Coast of Peninsular Malaysia. Other fishing gears used include trawl net, drift net, ring net, scoop net, and hook and line. In the Southeast Asian region, the production of scads including the Indian scad (*Decapterus russelli*), scads *nei* (*Decapterus* spp.), bigeye scad (*Selar crumenophthalmus*), yellowstripe scad (*Selaroides leptolepis*), hardtail scad (*Megalaspis cordyla*), jacks, crevalles *nei* (*Caranx* spp.), and Carangids *nei* (Carangidae) in the Fishing Area 71 was more than three times higher than in Fishing Area 57 (**Figure 57**). Between 2008 and 2019, the average production was around 0.31 mt per year in Fishing Area 57 and 1.14 mt per year in Fishing Area 71.

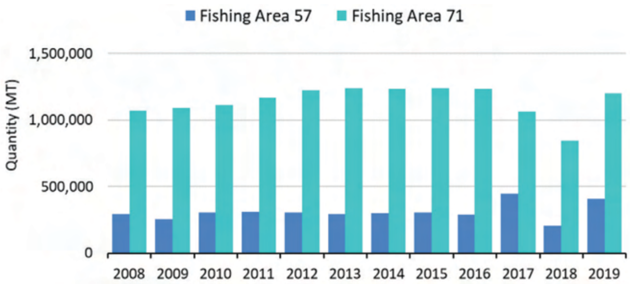

Figure 57. Production of scads of Southeast Asia between 2008 and 2019 from Fishing Area 57 and Fishing Area 71, by quantity (mt)

Source: SEAFDEC, 2022

Exploitation rate

The exploitation rate (E) value of more than 0.50 demonstrates that the fishery resource in such an area is exploited more than the optimum level (Gulland, 1983). In the South China Sea, the highest E value was recorded for *D. macrosoma* (0.86) and *D. maruadsi* (0.86) in the waters of Brunei Darussalam. In the Andaman Sea, the highest E value was recorded for *D. maruadsi* at 0.71 in the Andaman Sea coast of Thailand (**Table 57**).

Issues and Challenges

- Insufficient historical time series data and lack of regular collection of data and information
- The validity and reliability of some data submitted

Table 57. Estimated exploitation rate (E) of scads in the South China Sea and Andaman Sea (E- Exploitation rate, F-Fishing mortality; Z-Natural mortality, FMA 711-Fisheries Management Area 711, WCPM-West Coast of Peninsular Malaysia)

Country	Fishing ground	Species	Year	Exploitation rate (E=F/Z)	Reference
South China Sea					
Brunei Darussalam	Brunei waters	*Decapterus macrosoma*	2003–2005	0.86	Matzaini *et al*., 2007
	Brunei waters	*D. maruadsi*	2003–2005	0.86	Matzaini *et al*., 2007
Indonesia	Pekalongan Pemangkat	*D. russelii*	2005	0.55	Wudianto *et al*., 2007
	FMA 711 SCS		2015	0.37	Duto, 2016
	Pekalongan Pemangkat	*D. macrosoma*	2005	0.48	Wudianto *et al*., 2007
	FMA 711 SCS		2015	0.72	Duto, 2016
Malaysia	Tok Bali	*D. macrosoma*	2003–2005	0.59	Samsudin, 2007
	Kuantan		2003–2005	0.73	
	Kota Kinabalu		2003–2005	0.50	Ahemad & Irman, 2007
	Kudat		2003–2005	0.82	
	Tok Bali	*D. maruadsi*	2003–2005	0.75	Samsudin, 2007
	Kuantan		2003–2005	0.70	
	Sarawak waters		2003–2005	0.76	Hadil, 2007
	Kota Kinabalu		2003–2005	0.27	Ahemad & Irman, 2007
	Kudat		2003–2005	0.59	
Philippines	Tayabas Bay	*D. macrosoma*	2011	0.32	Ramos *et al*., 2018
		D. maruadsi	2013	0.23	
		D. macrosoma	2012	0.52	
Thailand	Gulf of Thailand	*D. maruadsi*	2018	0.71	Yamrungrueng *et al*., 2018
Andaman Sea					
Indonesia	Palembang	*D. russelli*	2005	0.53	Wudianto *et al*., 2007
		D. macrosoma	2005	0.55	
Malaysia	WCPM	*Decapterus spp.*	2003–2005	0.59	Sallehudin *et al*., 2016
Thailand	Andaman Sea Coast of Thailand	*D. maruadsi*	2007	0.71	Boonsuk *et al*., 2010

- Lack of statistical database system for catch and effort
- Lack of specific fisheries management plan for scads fisheries including fishing effort, fishery regulation, traceability system, cooperation, among others

Way Forward

The ongoing project "Fisheries Management Strategy for Pelagic Fish Resources in the Southeast Asian Region" (2020–2024) under the JTF VI Phase II project is being implemented by SEAFDEC/MFRDMD and the activities include stock and risk assessments for scads.

1.1.3 Mackerels

Mackerels are under the family Scombridae that feed on plankton, crustaceans, mollusks, fish eggs, and small fishes, and could be found at water depths between 20 m to 90 m, *e.g.* short mackerel (*Rastrelliger brachysoma*) are mostly in the inshore areas while the Indian mackerel (*Rastrelliger kanagurta*) are at the offshore areas (Hadil & Richard, 1991). A study conducted in the South China Sea and the Andaman Sea has voted for a single unit stock for the management purpose of the Indian mackerel (*R. kanagurta*) since the fish species in the South China Sea and the Andaman Sea share the same stock with high genetic variation (Akib *et al*., 2015; Wahidah *et al*., 2013). A single genetic stock of *R. brachysoma* has also been identified in the Gulf of Thailand. The mixed-stock analysis revealed that the Samut Songkhram population has been the major contributor (52.71 %) to the total catch from the Inner Gulf of Thailand. The Surat Thani population dominantly contributes 46.23 % to the total catch from the lower part of the Central Gulf of Thailand, where the fishing ground surrounds its spawning ground. The populations from Cambodia and Malaysia corporately contribute 70.95 % and 87.88 % to the total catches from the Eastern Gulf of Thailand and upper part of the Central Gulf of Thailand, respectively (Kongseng *et al*., 2021). A study on the distribution and density of mackerel larvae *Rastrelliger* spp. in the northwest coast of Peninsular Malaysia (Yan, Kedah) found that the highest density occurs in September compared to August and October (Nur-Hidayah *et al*., 2020).