Table 50. Production of sardines in the Southeast Asian region in 2008 and 2009

Country	FAO Common Name	Scientific Name	Quantity (MT)		Value (US$ 1,000)	
			2008	2009	2008	2009
Indonesia	Spotted sardinella	*Amblygaster sirm*	5,618	6,050	72,258	120
	Goldstripe sardinella	*Sardinella gibbosa*	174,356	175,800	10,645,067	22,110
	Bali sardinella	*Sardinella lemuru*	139,350	139,010	5,345,563	36,790
Malaysia	Diadromous clupeoids nei	*Clupeoidei*	850	1,025	4,382	3,657
Philippines	Sardinella nei	*Sardinella* spp.	369,199	467,853	208,562	232,967

Source: *Fishery Statistical Bulletin of Southeast Asia (SEAFDEC, 2011)*

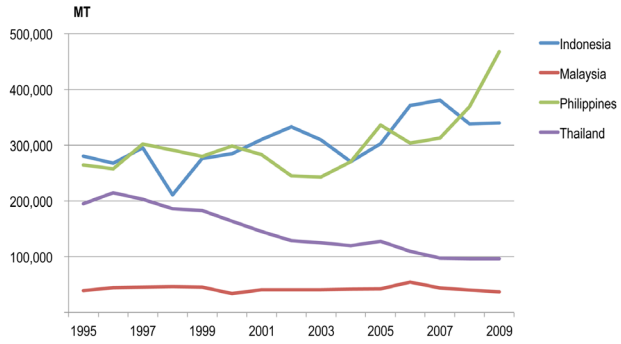

Figure 31. Production status and trends of sardines in selected Southeast Asian countries (1995-2009)

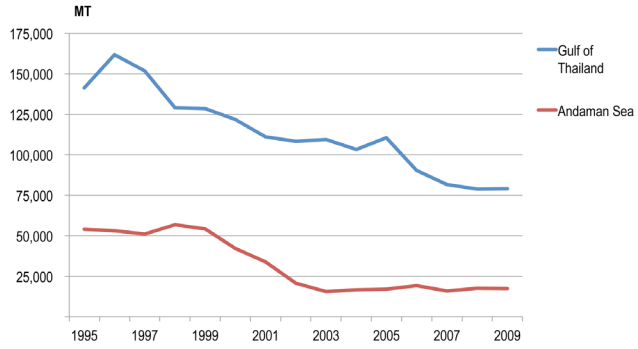

Figure 32. Decline in production trends of sardines in the Gulf of Thailand and Andaman Sea (1995-2009)

species are: *Sardinella gibbosa*, *S. frimbriata*, and *S. albella*. Sardines are normally scattering in the coastal and offshore areas at water depths ranging from 30 to 70 m. The peak of the spawning season of sardines is in March-April and July-August in the Gulf of Thailand. The main fishing gear used is purse seine with and without luring lights, encircling gill net, lift-net, set net, and bamboo stake trap. For countries like Indonesia, Philippines and Malaysia, sardines are also among the important small pelagic species and are usually utilized for several products such as canned, dried, smoked, boiled, fermented (fish sauces), cured, made into fishmeal, and also marketed fresh.

However, the total production of the main sardine producing countries in the region seemed to have fluctuated from 1995 to 2007, with the total catch varying within the range from 730,000 MT and 846,000 MT, with peaks noted in 1996 and 2006. By country, the total catch of sardines was stable at about 50,000 MT in Malaysia, while for Indonesia and the Philippines the catches fluctuated but seemed to follow slight increasing trends during the period from 1995 to 2007 with the sardine catch of the Philippines increasing from 264,000 MT in 1995 to 313,000 MT in 2007. In addition, the sardine catch of Indonesia also increased from 280,000 MT in 1995 to 380,000 MT in 2007 (**Fig. 31**).

Specifically for Thailand, sardines production gradually declined from 220,000 MT in 1996 to about 100,000 MT in 2007 (**Fig. 32**), where most of catch came from the Gulf of Thailand which was about three times more than that of the Andaman Sea. Nonetheless, the total catch also seemed to be declining in the Gulf of Thailand and Andaman Sea from 162,000 MT in 1996 to 82,000 MT in 2007, and from 53,000 MT to 16,000 MT, respectively, and the overall production of sardines in selected Southeast Asian countries from 2008 to 2009 seems to have increased as shown in **Table 50**.

1.2 Deep Sea Fishery Resources

Although almost 50% of the Southeast Asian waters comprised continental shelf but there are also continental slopes and deep basins down to nearly 1,000 to 5,000 meters deep which form the largest habitats of various fishery resources especially around Indonesia, Philippines, and some parts of Andaman Sea (Sukramongkol, 2011). Within the depth of 100 meters, the fishery resources are intensively exploited by trawl fisheries especially the shallow-water fish species which have been well documented (Siriraksophon, 2006; Yasook, 2008; SEAFDEC/TD, 2009). Attempts to assess the status of the demersal resources at the unexploited range of 200-350 meter depths have been undertaken since late 70s by the Norwegian research vessel, Dr. Fridtjof Nansen in association with FAO (Nishida and Sivasubramaniam, 1986). However, information and biological knowledge on the deep sea fauna in the EEZs of the Southeast Asian countries are still inadequate especially the demersal resources in the continental shelf and slope beyond 100-meter depth. Currently, comprehensive knowledge on deep sea fishery resources could only be made

available from results of research explorations under some collaborative programs, *e.g.* "Census of Marine Life" survey project in Philippine Waters in 2005-2008, the "OFCF-AMFR Deep-Sea Joint Exploration" survey in the West Coast of Sumatra and Java of Indonesia between 2004 and 2005, "BIOSHELF Scientific Corporation Program" between Denmark and Phuket Marine Biological Center at the Andaman Sea of Thailand between 1996 and 2000 (Aungtonya *et al*., 2000; OFCF and AMFR, 2006; SEAFDEC, 2008; SEAFDEC, 2009b; SEAFDEC, 2010b).

A number of explorations conducted since 2004 in many areas off the Philippines and Indonesian waters where the sea depth ranged between 200 and 1000 meters provided general knowledge about the high diversity and abundance of fishery resources in these areas. Specifically, results of the surveys revealed that these areas serve as habitats of commercially useful species such as the red roughy (*Haplostethus crassispinus*), black roughy (*Haplostethus rubelloterus*), Alfonsino (*Beryx splendens*), and blackthroat seaperch (*Deoderlrieinia berycoides*) in the West Coast of Sumatra and Java of Indonesia, and significant catches of pandalid shrimps (*e.g. Heterocarpus woodmasoni*, *H. hayashii*, *H. dorsalis*) which were recorded in the continental shelf and slope off the West Coast of the Philippine waters (OFCF and AMFR, 2006; SEAFDEC, 2008). Results from the said joint explorations indicated that the fishery resources at the various parts of Indonesia and the Philippines are still under-exploited.

However, the ecosystems and resources are likely becoming vulnerable, particularly taking into consideration the low-productivity species and sensitive deep sea habitats. Such status could also be affected by the countries' current efforts and plans to expand their respective fishery operations towards the deep water areas. Responding to the increased human demand of fishery resources, attempts have been made by many countries to undertake commercial deep sea fishery operations starting in 2008. Commercial deep sea fishing practices such as gillnet, trawl, bottom longline, multiple hook and line, and traps had been undertaken in Indonesia and the Philippines (SEAFDEC, 2010b). However, the possible impacts of deep sea fishing are unknown because such practices are not yet well studied while there are still no specific regulations related to deep sea fishing practices that would ensure sustainable utilization of the deep sea resources in the Southeast Asian region. In addition, there is also limited knowledge on appropriate technologies for the utilization and exploitation of deep sea fishery resources. The FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas had been developed and adopted in 2008. Such Guidelines should therefore be taken into consideration by the countries intending to develop their respective deep sea fisheries. Since the Guidelines include deep sea fisheries within national jurisdictions, the implication of the extent of management requirements for deep sea fisheries in the EEZs should be carefully studied by the concerned countries.

1.3 Species Under International Concern

Driven by the world's escalating population growth and rising global demand for fishery products, fishing capacity has also been increasing over the years. As a result, approximately 47% of the main fishery stocks or species groups are fully exploited and are therefore providing catches that have reached or are very close to their maximum sustainable limits. Over time, the international community has launched various initiatives aimed at improving the conservation status of commercially-exploited aquatic species under the domain of both binding international and soft laws for the protection of various commercially-exploited aquatic species. Several regional fishery bodies (RFBs) and arrangements also play important role in the conservation and management of the fishery of commercially-exploited aquatic species such as tunas, sharks and billfishes in far-flung sea areas covering the coastal states and high sea areas. In order to regulate the trade and secure the sustainability of the fishery of endangered aquatic species, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as an international agreement among governments adopted in 1963, ensures that the international trade of specimens of wild animals and plants does not threaten their survival. Through the efforts of CITES, varying degrees of protection have been accorded to more than 30,000 species of animals and plants that are traded as live specimens, fur coats or dried herbs as the case may be.

For marine species, several commercially-exploited aquatic species have already been listed in the CITES Appendices such as the African blind barb fish and black corals (Appendix II in 1981), giant clams and hard corals (Appendix II in 1985), queen conch (Appendix II in 1992), sturgeons and paddlefish (Appendix II in 1998), coelacanths (Appendix I in 2000), basking shark, whale shark, and seahorses (Appendix II in 2002), humphead wrasse (Napoleon fish), great white shark, and Mediterranean date mussel (Appendix II in 2004), sawfishes (Appendices I and II in 2007), and European eel (Appendix II in 2007). Recently, the Atlantic bluefin tuna, red and pink corals, and eight shark species were proposed to be listed in the CITES Appendices during the last COP15-CITES in 2010. The Southeast Asian countries have noted the issues carefully because such aquatic species are economically-exploited in the region and thus, are economically important considering their close relationship with the region's traditional fisheries particularly the small-scale fisheries. However, due to insufficient information from stock assessment and