



Pelagic Fisheries Management for Sustainable Development: Myanmar Initiative

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Myanmar has a land area of 676,577 km² with population of about 56 million as of 2007 (estimated). It is bordered by five countries: China on the northeast, India on the northwest, Lao PDR on the east, Bangladesh on the west, and Thailand on the southeast. It has a coastline of 2832 km with its coastal areas in Rakhine State along the Bay of Bengal, and in Ayeyarwaddy and Tanintharyi Divisions along the Andaman Sea. Such long coastline stretches along the coastal areas forming almost 228,781 km² of continental shelf where the water is so fertile and enriched with nutrients and planktons. The country's major economic sectors are agriculture, forestry and fisheries, and in 2007, the fish per capita consumption was reported to be 41.0 kg/year. The country's fish workers was reported to be over 2 million (2007, estimated).

The mission of the country's fishery sector is to promote all around development in order to increase fish production for domestic and foreign markets by responsible expansion of marine fisheries and aquaculture in order to upgrade the socio-economic status of the fishing communities. In carrying out this mission, the Department of Fisheries of Myanmar aims to: produce fish on sustainable basis; uplift the role of fisheries sector and fishing communities; produce sufficient amount of food for local consumption as well as for foreign markets; invite more investments, local and regional; avoid over-exploitation and destruction of fish stocks; develop sustainable aquaculture; safeguard

fishery resources and protect fish habitats; and develop technology on value-added fish products.

Myanmar is exerting efforts to manage and conserve its pelagic fish stocks in order to avert possible over-exploitation of the fishery resources. The country is specifically endowed with abundant pelagic and demersal fish resources. In terms of biomass, it has been estimated that there is close to 1.0 million mt of pelagic fishes and about 0.75 million mt of demersal fishes while the total annual maximum sustainable yield (MSY) is about 1.04 million mt (**Table 1**).

Myanmar's fishing grounds for pelagic fishes are generally the muddy-sandy bottom that is associated with rich plankton biomass. The coastal small pelagic fishes inhabit the nutrient-rich inshore neritic waters while the large pelagic fishes inhabit the offshore oceanic waters. The shallow-water fishing grounds are highly productive and account for the country's total pelagic fish catch. The small pelagic resources are exploited mostly by shallow-water purse seines, surface and mid-water gillnets, lift nets, and other surrounding nets while other pelagic fishes are caught by trawls, drift nets, long line, etc. In 2006-2007 there were about 1849 fishing gears exploiting the pelagic fishery resources of Myanmar (**Table 2**).

The major fish species that comprise the country's economically important pelagic fishery resources are

Table 1. Total fish biomass and MSY in Myanmar's marine waters (million mt)

Area	Biomass			MSY		
	Demersal	Pelagic	Total	Demersal	Pelagic	Total
Rakhine	0.194	0.175	0.369	0.160	0.087	0.248
Delta (Yangon, Ayeyarwaddy, Mon)	0.334	0.505	0.840	0.220	0.253	0.473
Tanintharyi	0.256	0.295	0.551	0.170	0.147	0.317
TOTAL	0.784	0.975	1.760	0.550	0.487	1.038

Table 2. Types and number of fishing gears used in pelagic fisheries of Myanmar (2006-2007)

State/Division	Trawl	Purse seine	Drift net	Long line	Stick-held falling net	Trap	Total
DOF Head Office	385	68	131	-	1	80	665
Rakhine	2	-	-	-	-	6	8
Tanintharyi	325	54	-	-	22	75	476
Ayeyarwady	-	-	526	2	-	-	528
Mon	-	-	172	-	-	-	172
Total	712	122	829	2	23	161	1849

the mackerels, sardines, round scads, big-eye scad, and carangids. Mackerels (*Rastrelliger kanagurta*, *Rastrelliger brachysoma*) are caught mainly by purse seines, encircling gill nets and occasionally by bottom trawls. Their fishing grounds extend widely from the inshore waters to the offshore waters of Myanmar's coastal areas.

The sardines found in Myanmar waters belong to the *Sardinella* spp., *Amblygaster* spp., *Dussumiera* spp., and *Herklotsichthys* spp. Among the most common are the goldstriped sardines (*Sardinella gibbosa*), fringescale sardines (*Sardinella fimbriata*) and spotted sardines (*Amblygaster* spp.). It should be noted that in the country's fisheries statistics reports, these are all grouped under *Sardinella* spp. Sardines are widely distributed in the country's coastal waters, and are mainly caught by purse seines, encircling gillnets and drift nets.

The most common round scads found in the waters of Myanmar are the *Decapterus marosoma* and *Decapterus marudsi*, which are widely distributed in its offshore waters. Round scads are mainly caught by purse seines. The country's catch of round scads are treated altogether as *Decapterus* spp. in the fisheries statistics reports. The big-eye scad (*Selar crumenophthalmus*) is also abundant and widely distributed in the offshore waters of Myanmar. This fish species is caught together with the round scads by purse seines as well as trawls. Other carangids are also abundant in Myanmar including about 39 species belonging to families Atule, Carangoides, Scombroides, Selar and Selaroides. These species are important in terms of the quantity landed, but are treated altogether as other carangids in the country's fisheries statistics reports due

to difficulties in the field identification of the various species.

Hilsa shad is another important pelagic fish resource in Myanmar, contributing much to the national economy through the small-scale fisheries industry. Hilsa is distributed widely in the entire coasts of the country as well as in inland waters. The fish takes an anadromous migration pattern during spawning through the country's river system, particularly the Ayeyarwaddy river complex.

There are two species of Hilsa in Myanmar. *Tenulosa toli* (Toli shad) is found in Tanintharyi area while *Tenulosa illisha* (Hilsa shad) is common in Ayeyarwaddy and Rakhine areas. Fishing season in the country's delta for the Hilsa shad is from September to March with peak seasons in August and September. While before encircling gillnets were used to catch the fish, during the last decade new fishing technology was introduced using the purse seine resulting in increased catch.

Issues and Constraints

The pelagic fishery resources are economically important to Myanmar. Although not specified separately by fish species, the marine fisheries production of Myanmar in 2004 was 1,091,740 mt (FAO FishStat Pus 2006). The country's total export in 2006-2007 was estimated at 343.43 thousand mt valued at USD 466.16 million (**Figure 1**), although this data comprises the freshwater and marine species. Considering that the country has an estimated 1.75 million mt of pelagic and demersal fish resources available for exploitation, much could still be done to improve the

country's production from its marine fishery resources through sustainable fisheries management.

However, the country lacks the appropriate technology as well as skilled manpower to conduct a complete survey of the pelagic fishery resources in a scientific and systematic way to be able to assess the stock and biology.

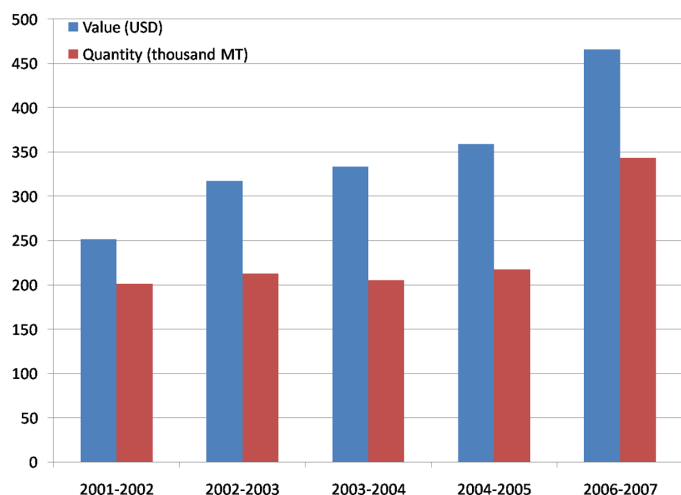


Figure 1. Trend of Myanmar's fish export
(Source: Department of Fisheries of Myanmar)

Way Forward

Meanwhile, in its effort to improve monitoring activities on this economically important fishery resource, Myanmar has committed itself to participate actively in the tagging program conducted by SEAFDEC in order to be able to gain knowledge in tagging small pelagic fishes as a way of knowing the movement and behavior as well as the migration routes of the small pelagic fishes. With information and data on the status and utilization of the country's pelagic fishery resources collected through the tagging activities, the Department of Fisheries of Myanmar would be able to promote the management of its pelagic fisheries while effectively utilizing the resources in a sustainable manner.

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Advancing the Development of GMP and SSOP for Small and Medium-Sized Fish Processing Establishments in the Philippines

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The strict implementation of quality assurance systems through GMP and SSOP application by small and medium-sized enterprises (SMEs) engaged in processing of traditional fish and fishery products is a vital component in the production of quality products that are safe for human consumption. In the Philippines, this ideal situation is a rather difficult pursuit for certain SMEs that are generally operating under budgetary constraints. Low-cost facilities are still commonly used such as drums for fish smoking, improvised trays for natural/solar drying, bench top retorts or pressure cookers, earthenware jars or concrete tanks for fermentation. The operations are mainly carried out manually, oftentimes under unfavorable sanitary conditions. This state of operations has to be corrected if competitiveness in international trade is to be achieved.

In the Philippines, the operational definition of "small and medium enterprise" is provided in Section 3 of the Magna Carta for Small Enterprises (Republic Act No. 6977, as amended by Republic Act No. 8289) which classifies them as "any business activity or enterprise engaged in industry, agribusiness and/or services, whether single proprietorship, cooperative partnership or corporation whose total assets, inclusive of those arising from loans, but exclusive of the land on which the particular business entity's office, plant and equipment are situated, must have values falling under categories shown in **Table 1**. In 2003, there were 1124 fish processing establishments in the Philippines, of which 963 were micro establishments (86%), 124 were small enterprises (11%), 25 were medium-sized (2%), and 12 were large enterprises (1%) (**Table 2**). Moreover, there were 67 GMP/SSOP certified establishments which were EU approved but this number decreased to only 33 in 2005 (**Table 3**).

Table 1. Classification of SMEs in the Philippines

Category	Based on Asset Value	Based on Employment Size
Micro	Less than PhP 1,500,001 (USD 32,608), USD 1.00 = PhP 46.00	1-9 employees
Small	PhP 1,500,001 to PhP 15,000,000 (USD 32,608-USD 326,086)	10-99 employees
Medium	PhP 15,000,001-PhP 100,000,000 (USD 326,086-USD 2.17 million)	100-199 employees

Table 2. Number of fish processing establishments in the Philippines as of 2003

Category	Based on Employment Size	
	Number	%
Micro	963	86
Small	124	11
Medium	25	2
Large	12	1
Total	1124	100

Source: National Statistics Office, Industry & Trade Department, Statistical Sampling & Operations Division

Table 3. GMP/SSOP Certified/EU Approved Fish Processing Establishments in the Philippines

Year	GMP/SSOP Certified/ EU Approved		Total Number of GMP/SSOP Certified Establishments
	Large	SME	
2000	14	31	45
2001	11	29	40
2002	10	29	39
2003	12	55	67
2004	11	47	58
2005	8	25	33

Source: Bureau of Fisheries & Aquatic Resources, Fish Inspection Unit

Issues and constraints on the development of GMP and SSOP

The decreasing number of certified/approved establishments adopting good manufacturing practices (GMP) and standard sanitation operating procedures (SSOP) as shown in Table 3 indicates the present need for the stricter implementation of food safety assurance program(s) by food manufacturers which are the emerging requirements of the regional and international markets. It is therefore imperative that the implementation of GMP/SSOP, especially by the pre-processing and traditional fish products processing establishments is strictly observed to ensure that the country's supply of processed fish is safe for human consumption and acceptable as export commodities.

Plan of Action

In order to address the issues confronting the country's fishery products, GMP/SSOP programs will be developed for selected small and medium-sized fish processing establishments (SMEs) engaged in the production of pre-processed as well as traditional fish and fishery products. Moreover, assistance will be provided for the implementation of the programs in these SMEs thereby assuring the quality and safety of the fish products produced in the Philippines.

During the selection of the SMEs for the SEAFDEC Program on Quality Assurance Systems for Small and Medium-Sized Fish Processing Establishments in ASEAN Member Countries, producers of selected pre-processed and traditional fish and fishery products will be surveyed to assess their existing facilities and the general manufacturing practices employed. These facilities and practices will be evaluated in terms of their implementation of, and compliance to GMP/SSOP requirements. GMP/SSOP program(s) will then be developed for the identified SMEs with non-satisfactory operational conditions and practices. Visits to these SMEs will be conducted to assist them in the implementation of the developed GMP/SSOP programs. Eventually, handouts on GMP/SSOP will be provided for their guidance.

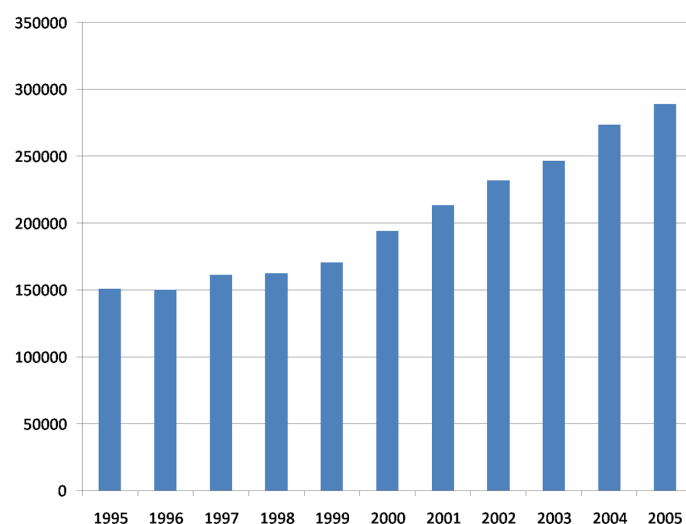
Thus, GMP/SSOP programs will be developed for the participating PPE producing pre-processed, salted shrimp which is the necessary raw material for shrimp paste production. Shrimp paste is popular and is part of almost every Filipino meal. It is also exported by the Philippines although at a limited degree. In 2004, the Philippines' export of shrimp paste was 625 mt valued at USD 1,595,000 (FAO FishStat Plus 2006).

In addition, GMP/SSOP programs for crab meat picking will also be developed, the crab meat being used for the country's crab meat canning industry. FAO FishStat Plus 2006 reported that the Philippines' export of canned crabmeat in 2004 was 1443 mt valued at USD 18,860,000. GMP/SSOP programs of traditional product processing establishments (TPEs) for the production of smoked fish and milkfish fillets (choice-cut belly) will also be developed under the SEAFDEC Program.

In 2004, the Philippines was reported to produce about 10,000 mt of smoked sardines and sprats (FAO FishStat Plus 2006), almost 90% is sold and consumed locally. The process of smoking fish involves arranging the fish in bamboo trays for sun drying after which the fish is cooked. Then the cooked fish is arranged in trays for smoking.

Moreover, milkfish is a very important fish for the Filipinos not only for food but also as an export commodity of the Philippines. In 2004 the Philippines produced 273,593 mt of milkfish (**Figure 1**) of which about 253,000 mt (about 92%) of fresh, chilled or frozen milkfish valued at USD 1,416,000 was exported (FAO FishStat Plus 2006). The Philippines is exporting milkfish in frozen, canned, dried, smoked or marinated forms to more than 30 countries. In the local front, domestic consumption of milkfish is estimated at 1.96 kg/capita/year. One of the most popular product forms from milkfish is the choice-cut belly because of the “melt-in-the-mouth” belly fat. The processing of the fish choice-cut belly is an industry in itself dominated by large-scale industries, e.g. Sarangani Boneless Bangus in Mindanao (south of the Philippines), and Bonuan Boneless Bangus in Dagupan City in northern Philippines.

The processing of the choice-cut milkfish belly involves cleaning, splitting, gutting and eviscerating the fish, then deboning it after which the belly is cut off. The belly parts are packed then quick frozen ready for the market. The trimmings are turned into other product forms such as “sisig”, rellenito, siomai, patties, nuggets, etc.



Source: BFAR

Figure 1. Philippine production of milkfish

Expected Results

Other SMEs engaged in the manufacture of pre-processed and traditional fish/fishery products can also have the opportunity to pursue similar activities to increase the country’s chances at the export market if given the right technical support. The participation therefore of the Philippines in the SEAFDEC Program on Quality Assurance Systems for Small and Medium-Sized Fish Processing Establishments in ASEAN Member Countries, which is being funded by the Japanese Trust Fund Program is expected to enhance the development of GMP/SSOP programs for the country’s SMEs in fish processing. Specifically, the following outputs are expected to be achieved:

- Development of the appropriate GMP/SSOP Programs for the selected pre-processed and traditional products, enhanced by the publication of the respective manuals for use as guide in implementation.
- Pilot projects pursued to help fine-tune and improve their manufacturing operations, through monitoring and evaluation of the program implementation to help ensure the safety of the fish products being marketed for human consumption.

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