Present Status of Fish Processing Industry in Myanmar and Implementation of HACCP System

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■ Introduction

The Department of Fisheries (DOF), under the Ministry of Livestock & Fisheries, is the government agency responsible for the inspection and licensing of all export oriented fish processing industries in Myanmar.

The Department is concerned for the export-oriented fish processing industries to ensure food safety and to meet with the health and sanitary requirements of the importing countries. During the last four fiscal years (1995-2000), the development of the fisheries sector of Myanmar have achieved significant results. Annual fishery production, catching and aquaculture, has increased from approximately 673,000 tonnes in 1995 to around 1,032,000 tonnes in 2000 (Table 1), while the export for the corresponding year from approximately 54,324 tonnes to 116,591 tonnes in 2000 (Table 2). In comparison with the other economic sectors, Myanmar fishery sector is now ranked in third position in export value and it is the fastest growing sector in the economy.

■ Present Status of Fish Processing Activities in Myanmar

The traditional processing factories produced salted, dried, smoked and fermented fish products. They are mostly operated by small scale processors to cater to the domestic market while a number of medium and large scale factories recently found are also oriented for export market.

The export oriented processing industries comprise of 85 freezing plants and 5 fish meal factories in Yangon and all along coastal area (Fig 4). These factories target their products mainly for export market .The main export commodities include shrimp, fish fillet, surimi, whole/ gutted (marine/ freshwater fish), dried fish/shrimp, live crab, eel and live lobster which are exported by normal and border trade system.

The main shrimp species include tiger *(P.monodon)*, white shrimp *(P. merguiensis)*, pink shrimp (Metapeneaus spp.), freshwater prawn *(M.rosenbergii)*, lobster (Panularius) and mud crab *(Scylla serrata)*.Shrimp are marketed either live, fresh (chilled), frozen or dried. Product is categorized as head-on, headless, peeled, peeled and deveined. (PND), peeled and undeveined (PUD), peeled tail-on (PTO), individually quick frozen (IQF) method or block frozen method according to the requirement of intended market.

Presently, the 85 processing plants can produce 380 tonnes/day of frozen products and total cold storage capacity in these plants is 16,244 tonnes. Ice-making facilities provide daily the production of 4,241 tonnes/ day. Delivery to shipping port uses refer containers and transportation of raw materials and products for domestic market uses insulated trucks.

Some customers of Myanmar seafood are companies which reprocess and repackage with their trademark. These products are then re-exported. For example, most of the product exported from Myanmar to Hong Kong and Singapore are re-exported to Japan and EU countries. So far there are no complaints from buyer because most of the products are reprocessed as consumer packs. Seafood quality of Myanmar product is still accepted by buyer who buy them for reprocessing and sent to direct market.

If Myanmar seafood industry wants to enlarge its market and raise the value of its product, it should improve management and seafood quality by investing proper infrastructure facilities, upgrading production condition and ensuring hygiene standard in order to

meet the requirements of importing countries where the products are sold directly to consumers.

Present Fish Inspection System

The Export Quality Control Section under the DOF is the main organization providing services to the export-oriented fish and fishery product industries on fish inspection and quality assurance. Export Quality Control Section inspects mostly have pre-shipment inspection. Export Quality Control Section of DOF inspect fishery products for compliance with international standards for export where applicable and the imported requirements related to health, quality, safety and identity.

The DOF recognized that end product inspection alone is not enough to ensure the quality and safety of the products, so starting from 1999, the inspection system was based on HACCP. Inspection procedures and operations were revised with reference to CODEX guidelines, standard and code of practices on HACCP and GMP.

1. Plant inspection

Starting from year 2000, plant inspections were done by DOF inspectors according to plant rating system (A, B, C, D) based on CODEX and various importing countries' standards.

2. Pre-shipment inspection

The exported fish product is subject to mandatory inspection by DOF according to the Ministry of Trade.

3. Inspection laboratory facilities

The DOF recently reorganized the laboratory in Yangon and equipped it to analyze physical, chemical and microbiological parameters.

4. Physical assessment

The following physical assessment parameters are checked before stuffing of the cargo: weight, size, color, product temperature, foreign matter, dehydration, black spot, packaging and labeling.

5. Microbiological assesssment

Bacteriological tests are done as follows: standard plate count, coliform, faecal coliform, Staphylococcus aureus, Salmonella and V. cholera.

6. Chemical Assessment

Proximate Analysis Lab

Protein, fat, moisture, ash, salt

Food Additive Lab

Boric acid, sulphur dioxide, nitrite

Contaminant Lab

Arsenic, cadmium, mercury and lead

Toxicology Lab

Histamine, pesticide residue, antibiotic residue (under process)

Current legislation and jurisdiction

(1) Myanmar Marine Fisheries Law (1990).
(2) Ministry of Livestock & fisheries, Department of Fisheries Notification 6/94,10/94
(3) Ministry of Livestock & fisheries, Department of Fisheries Directives 1/95,7/96 to 12/96, 1/98 to 9/98.
(4) The National Food Law (1997), Ministry of Health.

On-going Implementation of HACCP System

HACCP system has been implemented in 7 processing plants in Myanmar since 1998. Ministerial competent authority was formed to take responsibility for food safety of exported fish and fishery products from Myanmar. Subcommittee was formed for supervision and for regular check of HACCP system application with reference to EU/FAO HACCP regulations. HACCP directive of Myanmar were issued for implementation of HACCP system. Processing plants are subjected to be checked by DOF inspectors on whether regulations issued by DOF are followed or not. Personnel also introduce verification and auditing of HACCP system from DOF.

Training for processing plant personel as well as DOF inspectors were found to be essential. Inspection/ testing equipment such as metal detectors and laboratory equipment are required as mandatory for processing plants. It is found some plants can afford to invest in

those equipments. Although DOF has installed major laboratory equipment, technology is not still lacking. It is required to encourage the plant owners to install full equipment for inspection of food safety.

Among 85 processing plants at present in Myanmar, Ninety percent of existing plants still need to implement HACCP system. Process flows have to be changed with respect to HACCP system. In order to meet HACCP requirements for new processing plants, directive relevant to the construction of new plants should be issued by DOF.

Biotoxin such as CFP, DSP and PSP are to analyzed seasonally and area wise.

■ Problems Facing the Fish Pocessing Industry

- Rules and regulations for quality management are to be adhered fully.
- The fishermen in fishing vessels and workers in fish farms are not fully trained for proper handling of raw materials to reduce post harvest losses.
- The fishing vessels, the equipment for landing, transport and storage of fish and fishery product not in good hygienic condition and not in proper boxes, resulting in deterioration and postharvest losses.
- In processing plants, the layout of production lines must be rearranged and HACCP system must be implemented to ensure the quality and safety of food.
- The aquaculture fisheries have not been developed to supply enough raw materials to the processing industries.
- Fluctuation in the supply of raw materials, unstable supplies resulting in excessive competition among fish processing industries.
- Lack of technology and know-how on quality management system.

■ Future Plans

- Expansion of the post-harvest services to improve fish handling and distribution through additional infrastructure facilities such as fishing ports, wholesale markets, etc.
- Establishment of quality control standards for fish and fishery products to ensure product acceptability.
- To provide additional advanced equipment and apparatus for the quality control laboratory in order to make services more responsive to the need of industries. There is also need to establish fish inspection and quality control laboratories in state and division.
- To increase the number of trained fish inspectors.
- Extension services program on good fish handling practices, quality consciousness and good manufacturing practices in the fish processing industries.

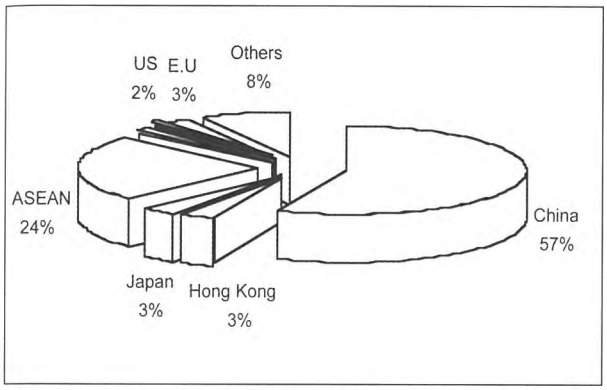

Fig. 1: Fisheries Product Export by Country in 1999-2000

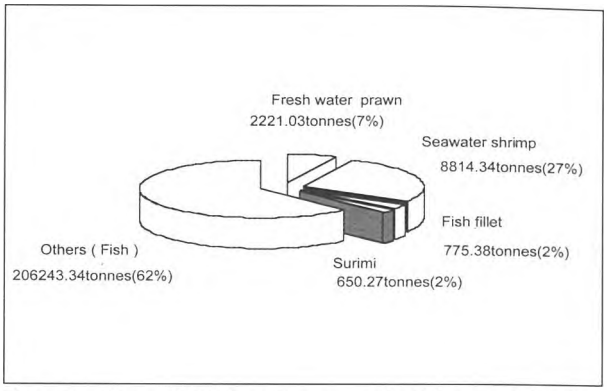

Fig. 2: List of Major Export of Fish & Fisheries Product by Normal Trade from Yangon in 1999-2000

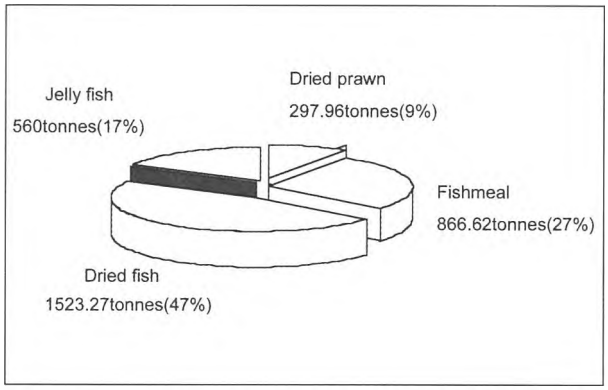

Fig. 3: List of Major Export of Fish & Fisheries Product from Yangon by Normal Trade in 1999-2000

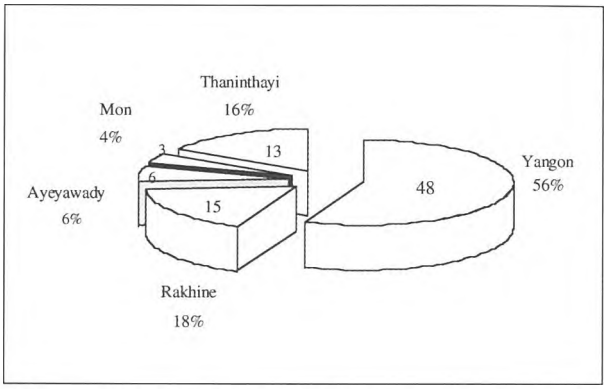

Fig. 4: Processing Plants in Yangon & Coastal Area

Table 1: Production of Fishery Product (1995 to 2000)

(MT— 000)

Particular	1995-96	1996-97	1997-98	1998-99	1999-2000
Fresh water fisheries	**218.002**	**229.758**	**231.244**	**238.605**	**252.737**
Culture fisheries	71.508	80.690	81.965	84.963	91.423
(a) Fish	—	78.618	79.573	82.523	87.733
(b) Prawn	—	2.072	2.392	2.440	3.690
Leasable fisheries	61.005	62.572	62.618	64.262	69.710
Open fisheries	85.489	86.496	86.661	89.380	91.604
Marine fisheries	**455.395**	**633.277**	**680.838**	**719.328**	**780.160**
Fish	—	604.018	652.850	687.260	746.962
Prawn	—	29.259	27.988	32.068	33.198
Total	**673.397**	**863.035**	**912.082**	**957.933**	**1032.897**

Source: Department of Fisheries, Myanmar

Table 2: Fisheries Product Export by Country (1995-2000)

Country	1995-96		1996-97		1997-98		1998-99		1999-2000	
	MT	Value (US$)	MT	Value (US$)	MT	Value (US$)	MT	Value (US$)	MT	Value (US$)
China	7340.98	4721185	10001.08	6613237	18827.68	14373770	61163.93	56328983	65410.75	54525954
Hong Kong (PRC)	4648.65	21029661	8129.57	29515372	5294.54	24529068	4410.29	18981879	3956.61	16788563
Japan	2566.18	11944750	4312.67	20817392	3485.40	17618631	3248.90	21130154	3868.17	20476237
Asean	37945.05	66769179	41881.50	92411129	40853.08	92815541	47847.49	78791032	27894.91	59138323
US	96.62	499786	240.13	1419887	444.36	1645758	730.16	2184563	1999.12	7383558
Canada	35.84	276639	73.12	429313	305.55	996357	497.48	3250403	535.91	2904304
E.U	508.34	3744474	729.30	4817144	1445.97	9933762	7577.64	10232063	3596.04	6317002
Others	1183.16	4702204	2033.45	7029348	3523.33	5177371	1397.84	10429547	9329.69	16171802
Total	**54324.82**	**113687878**	**67400.82**	**163052822**	**74179.91**	**167090258**	**126873.73**	**201328624**	**116591.20**	**183705743**

Source: Department of Fisheries, Myanmar

Table 3: List of Major Export of Fish & Fishery Products from Yangon by Normal Trade in 1999-2000

S/No.	Items	Quantity (tonnes)	Value (US$)
	Frozen/chilled	**33085.36**	**96,307,138.93**
1	Fresh water prawn	2221.03	17,414,791.29
2	Seawater shrimp	8814.34	54,150,179.34
3	Pomfret	1932.78	3,671,196.20
4	Hilsa	7769.86	7,653,205.95
5	Ribbon fish	1107.90	726,834.20
6	Rohu	3680.08	3,862,810.32
7	Rosy jewfish	948.98	488,826.50
8	Fish fillet	775.38	1,942,270.90
9	Surimi	650.27	535,682.00
10	F.W.F	1610.23	2,230,033.20
11	Yellow crocker	695.70	551,177.50
12	Threadfin	228.73	534,278.65
13	Tongue sole	486.15	192,808.35
14	S.W. F	2163.93	2,353,044.53
	Alive		
1	Mud crab	1251.44	3,744,304.75
2	Lobster	235.60	659,528.40
	Dried		
1	Dried prawn	297.96	659,528.40
2	Fishmeal	866.62	470,155.10
3	Dried fish	1523.27	1,834,408.93
4	Jelly fish	560.00	576,347.90
	Total	**37820.25**	**104,251,412.41**

Table 4: Case Studies of Block Frozen Shrimp (HO, HI, PUD, P&D, PPV)

HACCP

PRODUCT NAME(S): (SEA/FRESH WATER SHRIMP) FRESH BLOCK FROZEN (HL, PUD, P&D, PPV)

(1) Critical Control Point	(2) Significant Hazard	(3) Preventive Measure	(4) Critical Limit	(5)	(6)	(7)	(8)	(9) Corrective Action(s)	(10) Record	(11) Verification
				Monitoring						
				What	How	Frequency	Who			
1. RECEIVING RAW MATERIALS	Sulfite	Inspection	< 10ppm	Sulfite	Sulfite Checker	Each Received Lot	Reception	Reject	Material No. 1	Weekly Review
	Iron	Inspection	Nil	Metal	Metal detection	Each Received Lot	Reception	Reject	Material No. 2	Daily Record
2. SORTING	Bacterial growth	Control temperature	< 10°C	Temperature matter	By thermometer	Every 15 minutes	Line QC	Adjust temperature	Material No. 3	Daily Record Review
3. STORAGE	Bacterial growth	Control temperature	<-18°C	Temperature	By thermometer	Every 2 Hour	Cold storage operator	Adjust temperature	Temperature Monitoring Report	Biological test Daily Record Review