STATUS OF DEEP SEA SURVEY IN MYANMAR

Aung Htay Oo
Senior Fishery Officer
Fishery Resources Conservation Unit, R & D
Department of Fisheries

Introduction

Union of Myanmar has a long coastline of nearly 3000 kilometers which can be divided into three coastal regions. The Rakhine coastal region (from the mouth of the Naff River to Mawtin point, about 740 km) the Ayeyarwaddy Delta and the Gulf of Moattama (Martaban) coastal region (from Mawtin point to the gulf of Moattama, about 460 km) and the Taninthayi coastal region (from Gulf of Moattama to the mouth of the Packchan River, about 1200 km in the Bay of Bengal and the Andaman Sea.

Coastline of Myanmar formed several large estuarine, Delta systems and numerous offshore islands, Myanmar possesses a considerable diversity of coastal habitats, including coral reefs, mangroves, sandy beaches and mudflats. The coastal zone is a very diverse array of ecosystem, coral reef, sea grass bed, mud and sand flats, mangroves, bays, estuaries and sandy and sandy rocky shores. In addition, there are two major islands grouping, the Moscos Island in the north and the Mergui (Myeik) Archipelago in Tanintharyi, which consists of over 800 islands.

Rakhine state is situated in the westernmost part of the nation. Boarding with the Chin state in the North and Magway division. Bago division and Ayeyarwaddy division in the East and facing Bay of Bengal in the west. It is located between Latitude 17º 30´ North and 21º 30´ North and East Longitude 92º 10´ East and 94º 50´ East. The area of the Rakhine state is 22852.68 sq.km.

The Rakhine state is located in tropical monsoon region. Temperatures never rise or fall extreme ly as it is a coastal region. The average temperature of Sittway in May the hottest month of the year is 84º F (29º Celsius) and in January the coldest month of the year is 70ºF (21ºC). Rakhine state gets a lot of rain annually as the north-west monsoon wind blows from the sea almost right angle to the Yoma (Mountain range). Rakhine state gets the rain from storm that formed in the Bay of Bengal. Annual rainfall at the Thandwe is 221 inches, Kyaukphyu is 186 inches, and Sittway 203 inches. Torrential rainfall and tidal wave rise from the sea when cyclones that are formed in the Bay of Bengal enter Rakhine state, causing proper damages and flooded sea water in the low land area. Though the storm appears mostly in early and later period of rainy season, they sometimes appear in the mid rainy season.

There are fishing industries in Sittway, Kyaukphyu, Thandwe (lonetha) and Andrew bay. Most of the catch (fishes and shrimps) is transported directly to Yangon. Some are exported. The state own pearl culture station is situated on Apawye island near Thandwe. Sun dried fish and sundried salt are produced along the coast. Thandwe produced sundried Indian anchovy *Stolephorus indicus* species a lot and Spanish mackerel *Scomberomorus commerson* as well.

The previous deep sea surveys in Myanmar

In 1968, Jone & Bonnergi conducted the deep sea survey in 200 meter depth range, they estimated that 775 000 tonnes of demersal fish and 800 000 tonnes of pelagic fishes. Mr Shomura estimated that 625 000 tonnes of demersal fish in 200 meter depth line. Prasad and other researchers conducted survey and found that 326 000 tonnes of demersal fishes and

400,000 tonnes of pelagic fishes, and total 726 000 tonnes as MSY in 1970. Gulland also estimated 625,000 tonnes of demersal fishes in 1972. Then, Narr et al estimated based on the production of carbon per sq meter is 0.630 gm, the fish biomass is 1,512,000 tonnes in 1973. Again in 1977, Menon conducted the survey and estimated the 783,000 tonnes of demersal fish and 729,000 tonnes of pelagic fishes. In 1979-80, the FAO/UNDP conducted deep sea survey in Myanmar water with RV-Dr. Fridtjof Nansen using acoustic survey and modern equipments and estimated there were 750,000 to 800,000 tonnes of demersal fishes and 620,000 to 1,330,000 tonnes of pelagic fishes. So the MSY of that biomass has 200,000 tonnes of demersal fishes and 500,000 tonnes of pelagic fishes, totally 1.05 million metric ton as MSY.

In 1982, Dr. John Tarbit conducted the shrimp resources survey activities till 60 meter depth range in Rakhine area. They estimayed that there are 4370 metric tones of shrimps in 5102 sq miles water between 17º to 20º North Latitude.

In 1985, the department of fisheries conducted deep sea survey by 533 shrimp trawler; average mean catch of shrimp is 31.18 kg/hr. Then, the Thai-Myannar joint survey was conducted deep sea survey, mean catch rate was 31.6 kilogram/hr.

Later on the DOF of Myanmar and Southeast Asian Fisheries Development Center SEAFDEC conducted two times partial deep sea survey in our water in 2004 and 2007.

Since 2006, Southeast Asian Fisheries Development Center SEAFDEC had conducted demersal fishery resources living in Un-trawlable fishing grounds in Southeast Asian waters using SEAFDEC 2 and using other research vessels in collaboration with member countries. This aims to evaluate on the potential resources of economically important species in the un-trawlable areas. The survey area will be focused in the EEZ of member countries and/ or trans-bordering areas particularly in the un-trawlable fishing grounds.

Rakhine fishing grounds of Myanmar is one of the target survey area which is still lacking the information about the species diversity. it characteristics is narrow continental shelf with rocky area. It is therefore not suitable for trawlers but there is still a possible or other fishing gear such as bottom vertical long line. It is envisaged that the survey result will be analyzed together with data collected from other un-trawlable areas in the region.

The objective of the survey

- to investigate the potential resources of some economically important species on the un-trawlable ground at the Rakhine fishing ground of Myanmar using bottom long-line; and
- to introduce and carry out trial of the appropriated/ responsible fishing gears and practices for harvesting of fisheries resources on the un-trawlable grounds.

Materials and methods

Fishing gears:	bottom vertical long-line (Fig: 1) 360 hooks/ stations (20 baskets)
Bait:	squids
Immersions time:	2 hrs
No. of stations:	10 stations.
Survey area:	rocky area of Rakhine fishing ground (Fig. 4 table.1)
Topography survey:	portable echo sounder
Fishing vessels:	2 local fishing boats

Period: 23rd to 30th January 2009

Fishing port: Thandwe

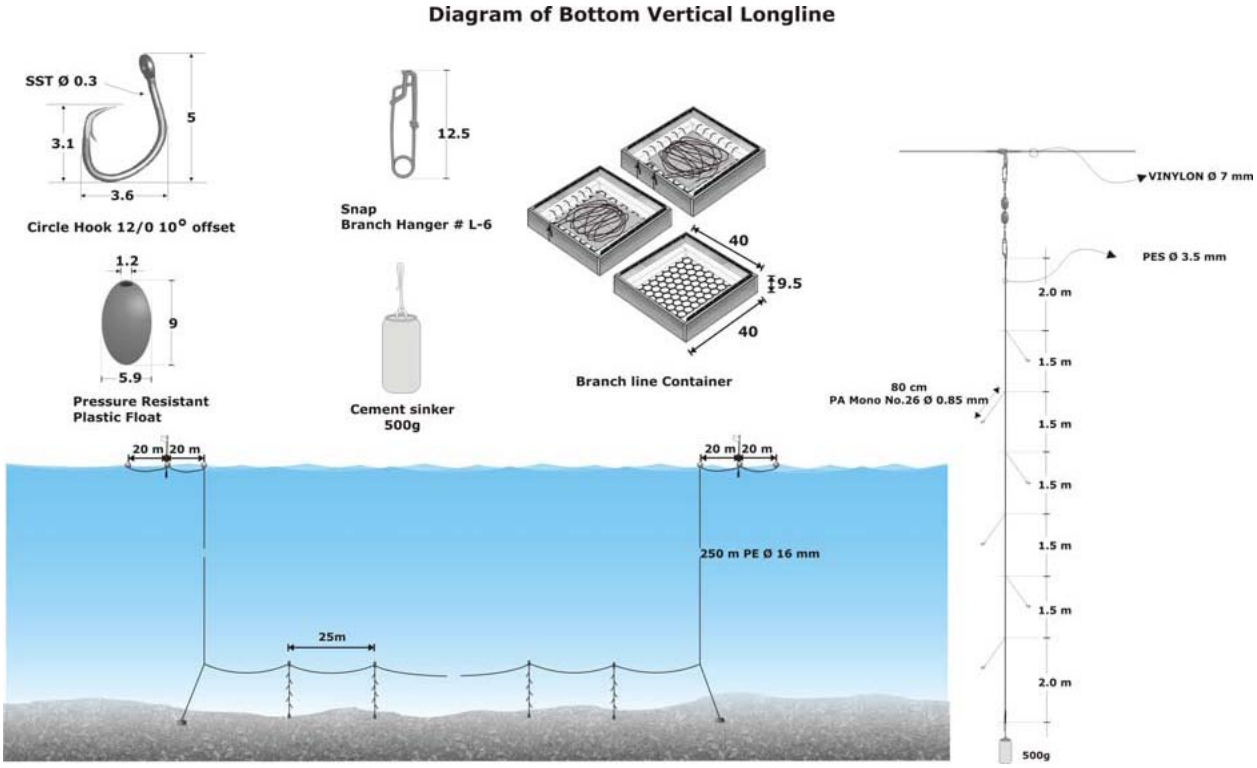

Fig. 1. Diagram of bottom vertical long-line

Participants:

From Southeast Asian Fisheries Development Center SEAFDEC /TD

1. Ms. Penchan Laongmanee — Coordinator
2. Mr. Sayan Promjinda — Team member
3. Mr. Narong Ruandsivakul — Team member
4. Mr. Nakaret Yasook — Team member
5. Mr. Aussawin Buachuay — Team member
6. Mr. Suchart Kitsamut — Team member
7. Mr. Tana Rangjoy — Team member

From department of Fisheries, Myanmar

1. Mr. Khin Maung Soe — Coordinator
2. Mr. Aung Htay Oo — Taxonomist
3. Mr. Khin Maung Thein — Team member
4. Mr. Kyaw Naing Htwe — Team member
5. Mr. Min Khine — Team member

Local fishermen

10 local fishermen join on board rental board.

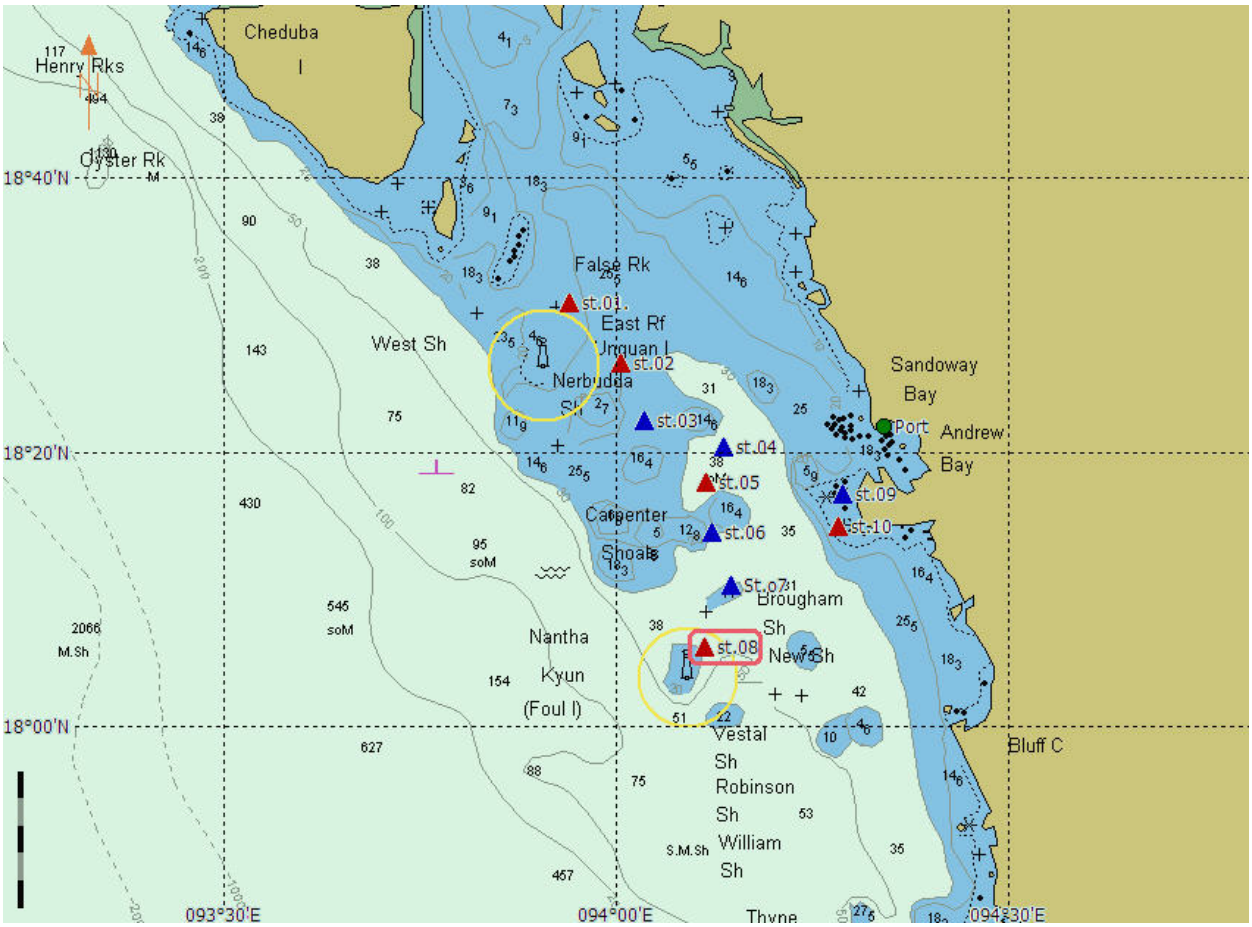

Figure 4. Fishing position map (red and blue triangle is position of boat no.1 and 2 respectively)

Daily performance note

23-1-2009	Afternoon about 3: leave for Thandwe by high-way bus (4 persons)
24-1-2009	7:30 am arrived Thandwe, stay at LintharOo hotel, arrangement for survey
25-1-2009	Preparation of the fishing gears and necessary thing such as battery, winch etc, and sea trail for testing handheld GPS and echo-sounder. Then we discussed to reschedule the activities. The average speed of two rental boats (ferry boats) is about 4 knots. There is no communication equipment on board therefore we have to rearrange the fishing ground to be rocky area that travel time is not more than 4 hr from fishing port. Another problem is the survey team could not travel to Gwa area, because of bridge collapsed on the way to Gwa.
26-30 January 2009	The two survey teams leave fishing port at 5:00 am, the detail fishing grounds information are showed in table 1. Before each operation, bottom topography was surveyed for suitable fishing ground (rocky area) using portable echo sounder. The fishing positions are showed in fig. 4. Catch them were identified and measured length and weight at the accommodation as report in table 2. After fishing operation of potential fishery resources survey as well as demonstration bottom long line to local fishermen, all fishing gears then were give to bottom long line fishermen.

Table 1. Partial information of survey for Demersal fishery resources in un-trawlable area in Rakhine fishing ground.

St no	Date	Number of hook used	Total catch (number)	Total catch weight (kg)	Hook rate	CPUE pc/1000 hooks
1	26-1-2009	396	2	2.45	0.51	5.05
2	26-1-2009	378	4	1.32	1.06	10.58
3	27-1-2009	360	2	0.70	0.56	5.56
4	27-1-2009	396	16	5.74	4.04	40.40
5	28-1-2009	360	0	0.00	0.00	0.00
6	28-1-2009	378	7	2.81	1.85	18.52
7	29-1-2009	366	10	4.58	2.73	27.32
8	29-1-2009	270	2	4.5	0.74	7.41
9	30-1-2009	378	2	0.36	0.53	5.29
10	30-1-2009	270	0	0.00	0.00	0.00

Table. 2. List of the species caught from Rakhine survey areas (26-30 January 2009)

Date	St no	Species	Common name	TL (cm)	FL (cm)	Wt (g)	BD (cm)	HL (cm)	sex
27-1-09	1	*Scolopsis monogramma*	Monocle bream	35	26.5	350	9	7.5	F
		Psudobalistes flavimarginatus	Yellowmargin trigger fish	44	-	2100	20	13.5	F
26-1-09	2	*Lagocephalus wheeleri*	Puffer fish	15.5	14	70	-	-	F
			Moray eel	126	-	750	-	-	M
			Moray eel	77	-	250	-	-	M
			Moray eel	68.5	-	250	-	-	F
27-1-09	3	*Cephalopholis Formosa*	Bluelined grouper	26	-	240	7.5	8.5	F
		Lethrinus sp.	Emperor	34.2	31.8	455	8.5	10.5	M
26-1-09	4		Moray eel	92.5	-	500	-	-	M
			Moray eel	75.5	-	291	-	-	F
			Moray eel	104	-	610	-	-	M
			Moray eel	94.5	-	500	-	-	M
			Moray eel	71	-	250	-	-	F
			Moray eel	75.5	-	291	-	-	F
			Moray eel	84	-	410	-	-	F
			Moray eel	67	-	190	-	-	F
			Moray eel	99	-	580	-	-	M
			Moray eel	74..5	-	260	-	-	F
			Moray eel	76	-	270	-	-	F
			Moray eel	100	-	510	-	-	M
			Moray eel	93	-	450	-	-	M
		Seriolina nigrofasiata	Blackbanded trevally	27	23.5	270	6.5	6.3	M
		Pomadasys hasta	Silver grunt	24		250	7.5	7	F

		Lagocephalus wheeleri	Puffer fish	16	14	100	-	-	F
28-1-09	6	*Nemipterus japonicas*	Japanese threadfin bream	18.5	17	90	5	4.6	-
		Nemipterus japonicas	Japanese threadfin bream	22.5	20	144	6	6	-
		Lutjanus erythropterus	Crimson snapper	30	-	423	10	8.7	-
			Moray eel	104	-	690	-	-	-
			Moray eel	67.5	-	190	-	-	-
			Moray eel	102.5	-	510	-	-	-
			Moray eel	56	-	130	-	-	-
29-1-09	7	*Arius sp.*	Sea catfish	44	36	740	7.5	10	M
		Arius sp.	Sea catfish	39.5	31	460	6	8.5	M
			Moray eel	67.5	-	200	-	-	M
			Moray eel	101	-	530	-	-	F
			Moray eel	65	-	165	-	-	M
			Moray eel	110	-	690	-	-	F
			Moray eel	92-	-	450	-	-	F
			Moray eel	63	-	180	-	-	M
			Moray eel	111	-	560	-	-	F
			Moray eel	109	-	600	-	-	F
29-1-09	8		Moray eel	107	-	604	-	-	M
		Arothron stellatus	Starry toad fish	53.5	-	3900	18	16	M
30-1-09	9	*Cephalopholis Formosa*	Bluelined grouper	25.9	-	240	8	8.3	M
		Cephalopholis argus	Blue spotted grouper	19.8	-	120	6.7	7	M

In Rakhine area, the major fishing gears used are small purse seine operate by two boats, light boat and seine boat. About 18 crews on those two boats. Fishing activity is only one night at sea, leave from landing site at about 17:00 pm and come back in the early morning. Crew is searching for the fish school by the experience eye in the night time, then luring light to aggregate fish before net shooting. Generally fishermen operate only one or two time per night. Fishing ground of small purse seine is about five nautical miles from shore (about 1.5 hr travel time).

Fishing season

The fishing season in this area is six month due to strong wind and wave that is influence of south west monsoon. Average catch of small purse seiner is about 200 viss (320 kg/season/boat). Catch that was observed on 30th January are king mackerel, black pomfret, frigate tuna, anchovy, mackerel, wolf herring, squid, etc.

Most of the catches then were dry under sun light for sending to Yangon and some were directly export to China. Only few good quality fish was daily transport to Yangon due to the inconvenient of transportation.

The other fishing gears that were observed are gill net, hand line and bottom long line. They more utilized pelagic then demersal resources.

Fishing village observation

When the fishing boats went to the sea for survey, there is a time to observe the fishing village. There are fishing villages or fishing communities along the coastline called "jade-taw". Sand

beaches along the coast, the fishing boats are loading the catch and young villagers carried the catch by buckets. And some are preparation for sun dried small fishes (most are anchovy). After finished the survey activities, all the member of the survey team have a chance to visit the fishing village jade-taw.

Survey team observed the local purse seine net construction at the workshop of the leader called U Nyi Lay Gyi and the morning activities of the village. There are the many labors for sun dried fish processing house. It can observed the process for the sun dried fish.

The interesting information from discussion with leader local fisherman called Mr. Nyi Lay Gyi who observed that the high abundance streaked spine foot in this area is 10 years cycle.

The findings for future

- The fishing time gap between (local fishermen and survey team) the nature of longliners and purse seiner local fishermen went out for fishing at evening time, came back early morning and the survey team use to go out sea at early morning finishing and came back evening time.
- Selected hook size, may be reduced amount of catch
- The capability of the fishing vessels, two of the using boats are ferry boats and the problem is they could not go out enough the depth range.
- Need to collect more parameters such as water temperature, salinity, etc,.
- Need to conduct more detail survey in Rakhine area collaboration with Southeast Asian Fisheries Development Center using MV-SEAFDEC 2