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ATLAS OF DEEP WATER DEMERSAL FISHERY RESOURCES IN THE BAY OF BENGAL

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ATLAS OF DEEP WATER DEMERSAL FISHERY RESOURCES IN THE BAY OF BENGAL

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This paper analyzes available data about deep-sea demersal resources in the Bay of Bengal region, most of which are presently unexploited. It contains maps on the distribution and abundance of 20 fish families, and a list of species found in the 100—600m depth zone.

Catch, effort and other relevant data for the paper were obtained mainly from cruises of the Norwegian research vessel *Dr. Fridtjof Nansen.* The catch composition, catch rate by species, depth, season, area and country were computed from these data with the help of the microcomputer program BOBFINS (Bay of Bengal Fisheries information System), developed by the project"Marine Fishery Resources Management in the Bay of Bengal", RAS/81/051, which is a component of the Bay of Bengal Programme (BOBP). The relationship between environmental factors and catch rates was also examined.

The analysis of deep sea demersal resources attempted by this paper should be viewed with caution, because of the limited data available.

Funded by the UNDP (United Nations Development Programme) and executed by the FAO (Food and Agriculture Organization of the United Nations), the Marine Fishery Resources Management project commenced in January 1983 and has a duration of four years. Its immediate objective is to improve the practice of fishery resources assessment among participating countries and to stimulate and assist in joint assessment activities between countries sharing fish stocks.

CONTENTS

1. INTRODUCTION

Marine fishery production from exploited areas of the littoral states around the Bay of Bengal is reaching or has reached its optimum level. In all these states, excluding the Maldives, the bottom trawl fishery has developed and expanded rapidly during the last couple of decades, mainly due to very favourable export markets for shrimps. Demersal fish exploited at present are components of the stocks distributed over the continental shelf, particularly within the 100 m depth zone. In view of the prevailing state of fisheries in this region and the increasing demand for food, it is appropriate to examine the unexploited resources available in the Exclusive Economics Zone (EEZs) of the countries around the Bay of Bengal. Demersal surveys beyond the 100 m depth have shown that unexploited species of fish, shrimps and lobsters occur in deeper waters. This study is an attempt to analyze available data to identify:

(a) the composition of the deep sea demersal resources;

(b) their distribution pattern and abundance; and

(c) the environmental conditions.

Besides the deep sea demersal resources, the mesopelagics are the only other unutilized deep sea resource in the region. The known deep sea pelagic resources are those of the tunas, billfishes, and sharks, which are already being exploited, largely by distant nations. No surveys have been specifically directed at the deep sea demersal and mesopelagic resources in the Bay of Bengal, and data available are sufficient only for a preliminary picture which could guide future actions.

During the late 70's, the Government of Norway had in association with the FAO assisted in surveying the marine fishery resources of many countries bordering the Indian Ocean. For all these surveys, Norway provided its research vessel *Dr. FridtjofNansen* which is well equipped for acoustic surveys, for fisheries oceanographic investigations and for experimental fishing with gears such as bottom trawl, mid-water trawl, purse seine, giflnet and longline. Between 1978 and 1980, R/V *Dr. Fridtjof Nansen* operated in the Bay of Bengal region and the waters of the Maldives. Though the primary method of survey was the acoustic method, several tours with the bottom trawl and oceanographic investigations were also made. Sri Lanka had the benefit of three coverages over a period of nine months and during different seasons; Burma and Bangladesh had two coverages over four to five months in each country; but Thailand, Malaysia, Indonesia and Maldives had only one coverage over a period of one to three months in each country. During all these surveys, the primary interest was on the resources of the continental shelf area. However, some surveys were also made over the sea bottom outside the continental shelf. These data constitute the backbone of the analysis attempted here.

2. AREA AND TOPOGRAPHY

The area investigated is the project area of the Bay of Bengal Programme (0°—22°N, 70°—100°E) The depth zone chosen for investigation was 100—600 m. The limit of 100 m was chosen because typical deep sea fishes generally begin to appear around that depth (Marshal 1954) and the maximum depth trawled during past surveys was 550 m.

Depths less than 100 m were also considered whenever deep sea fish were reported to be caught in that zone. The EEZ on the west coast of Peninsular Malaysia was excluded because the depth of the water in the area is less than 100 m. The project area, EEZ boundaries and the area of the bottom between 100 m and 600 m are shown in Figure 1. The configuration of the sea bottom within the project area is illustrated in Figure 2. On the basis of results of the

Dr. Fridtjof Nansen surveys, the bottom conditions were classified as smooth, uneven, rough and steep.

Bottom trawling was possible on smooth and uneven bottoms with the use of bobbins in the trawl net. The trawlable area in the 100—600 m depth zone was estimated from trawlable area maps from *Dr Fridtjof Nansen* cruises in the Bay of Bengal (excluding India) (Table 1).

Table 1

Country-wise distribution of EEZ, continental shelf, 100—600 m depth zone and trawlable area within the zone.

in'000 km²

	EEZ	Continental shelf **(0—200 m)**	100—600 m **depth zone**	Trawlable area * in **(100—600 m)** depth zone
Maldives	843	19	46	4?
Sri Lanka	256	30	11	2?
India (a+b+c)	1,359	182	195	
a. South (South of 10°N)	199	35	21	
b. East (North of 10°N)	560	112	91	
c. Andaman I.	600	35	83	
Bangladesh	124	70	23	10?
Burma	486	280	102	50 ?
Thailand (West)	111	44	94	30?
Indonesia (N. W. Sumatra)	434	102	85	20 ?
TOTAL	**3,613**	**727**	**556**	**116** ?

* Trawlable area = smooth + uneven bottom

Rough and steep bottom, which are difficult conditions for bottom trawling, generally begin around 200 m water depth. Though *Dr. Fridtjof Nansen* did conduct trawling operations in such grounds, the resulting maps indicating the bottom conditions represent the situation along the transects of the survey cruises, and not of the survey area as a whole.

3. SOURCES OF DATA

Catch and effort data from bottom trawl surveys for the 100—600 m depth range were obtained from the following sources:

1. Reports of eleven cruises (Table 2) of R/V *Dr. Fridtjof Nansen* around Maldives, Sri Lanka, Bangladesh, Burma, the west cost of Thailand, Peninsular Malaysia, and Sumatra which contain data on catch by species, duration of tows and fishing depth at each station.

Table 2

Survey Cruises of R/V *Dr. Fridtjof Nansen* in the Bay of Bengal
B: Number of bottom trawl tows. P: Number of pelagic trawl tows
100—600m depth range

Country	Month 1	2	3	4	5	6	7	8	9	10	11	12
Maldives								1980→ (B=14)				
Sri Lanka	1980→ (B==10)			1979-→ (B=6)				1978-→ (B=10, P=1)				
Bangladesh						1980 (B=13)					←1979—→ (B=13)	
Burma				←-1980→ (B=19)					←1979-→ (6=30)			
Thailand								←1980-→ (B =7)				
Malaysia							←1980-→ (0)					
Indonesia									1980 (B =4)			

Note: Hydrographic data were taken from reports of these cruises.

2. *India:* Reports of bottom trawl surveys conducted by the Fishery Survey of India and the Exploratory Fisheries Project of India. The published results are not as detailed as those of R/V *Dr. Fridtjof Nansen,* and vessels and trawl gear used were different. It is the only source of information for the east coast of India and the data available are scanty.

3. *Burma:* Results of trawling surveys by the FAO/UNDP Marine Fisheries Resources Survey and Exploratory Fishing Project (BUR/77/003): Six cruise reports (1981-83) of M/V No. 525.

4. *Thailand:* Results from the Thai-Japanese-SEAFDEC joint oceanographic and bottom trawl survey in the Andaman sea by NAGASAKI-MARU (November 1 —15, 1981). Three hauls were operated by deep-sea trawl (around the continental slope more than 200 m in depth).

The data on mid-water trawling for mesopelagic species were taken from the reports of *Dr. Fridtjof Nansen* surveys.

The characteristics of the vessels and gears used during the surveys are as follows:

R/V *Dr. Fridtjof Nansen* is a 150 ft stern trawler with a main engine of 1500 hp. The vessel used high opening shrimp trawl with bobbins adapted for fish trawling. The length of the head rope of the net (with bobbins) used off Burma, Thailand, Malaysia and Indonesia was 134 ft but it was 96 ft in the net used around Maldives, Sri Lanka and Bangladesh. The mesh size of the cod end appears to have varied from 21 mm to 40 mm during these cruises in different countries. The pelagic trawl used was 1600 mesh net with 16x16 fathoms mouth opening.

Indian trawl survey vessels ranged from 30.5 m to 40.5 m in overall length with 11 60—2030 hp. Details of the trawl gear used were not readily available.

Burmese survey vessel No. 525 is a 40 m stern trawler of 1500 hp. The trawl net (with bobbins) had a head rope of 35.3 m and 22.5 mm cod end mesh size.

4. ANALYSIS

4.1 Catch and Effort Data

The catch composition, catch rate (kg/h) by species, depth, season, area (grid 30' x30') and country were computed with the help of the 'BOBFINS' (Bay of Bengal Fisheries Information System) microcomputer program developed by BOBP. Seasonal variations could not be determined for areas in which only one cruise was conducted. It was assumed that seasonal migration may not be extensive in the case of these deep sea demersals, enabling a comparison of catch rates in different areas where the cruises were not conducted during the same season.

Sporadic records of size measurements of fish caught were available and this information is also presented without detailed analysis. Annual variations were assumed to be negligible.

4.2 Environmental data

The relations between environmental factors (temperature, salinity, dissolved oxygen, bottom condition and depth) and catch rates were examined with data available from cruise reports of *Dr. Fridtjof Nansen's* surveys. In each survey, several hydrographic transects were established with four or five stations per transect. For trawl stations for which hydrographic data were not available, data from the closest station were used.

Eleven species groups for which at least eight sets of environmental data were available, have been selected for analyses i.e., deep sea prawns *(Acetes* sp., *Aristeus semidentatus* and *Heterocarpus* sp.) (n=46); deep sea lobsters *(Pueru/us* sp.) (n =31); green eyes *(Chloroph-thalmus* sp.) (n==22); big eyes *(Pr/acanthus* sp.) (n=20); man-of-war fishes *(Cubiceps* sp., *Psenes* sp., and *Palinurichtus* sp.) (n= 19); lantern fishes *(Myctophum* sp.) (n=17); sea robins *(Peristedion* sp.) (n=12); deep sea sharks *(Haploblepharus* sp., *Scoliodon* sp., *Shyrna* sp., *Squalus* sp., and *Squatina* sp.) (n==11); lizard fishes *(Saurida* sp.) (n==8); and deep sea crabs *(Charybdissp.)* (n=8).

The ranges of environmental factors associated with higher CPUE (catch per unit effort), i.e. (median) > 25 kg/h, were investigated. Medians were used since they could reduce bias due to unusual data such as sporadic catch or too few catches in rich fishing grounds whereas the mean is easily affected by these data. Hence, medians can provide more reliable and robust representative values than means, especially when the sample size is small as in this case.

The Box-and-Whiskers plot in EDA (Exploratory Data Analysis) by Tukey (1977) was applied to create spectra of optimum environmental factors for the 11 species groups. Box-and Whiskers plots display five summary numbers by boxes (1st quartile – median – 3rd quartile) representing 50% of the samples around medians and whiskers (minimum values – 1st quartile and 3rd quartile – maximum values) (Figs. 24—27). Reasons for selecting Box-and-Whiskers plots were:

- Ranges of boxes can represent reliable, robust and conservative intervals for small samples.
- No influences by unusual data because this plot is also based upon medians.
- Easy-to-compare ranges of environmental factors among the 11 species groups because of the usage of standardized ranges (boxes).
- Even exteme values can be useful data by *counting* as large values *instead of using the value* as in parametric analysis.

The relationships among environmental factors in waters deeper than 100 m, was also analyzed by establishing regressions for temperature v/s depth, salinity v/s depth and temperature v/s salinity with a fairly large sample size (n=288).

5. RESULTS

5.1 Species and catch composition

The species recorded during the surveys are listed in Annexure 1. About 85 species belonging to about 54 families were identified from the catches in the 100—600 m depth zone. Of these, 27 species marked 'A' were recorded only in the catches from the 100—300 m depth zone and 16 species marked 'B' were found only in the 300—600 m zone. The remaining species occurred in both depth zones.

In the 100—300 m depth zone around the Bay of Bengal, the 10 predominant groups (each 4% — 13%) as observed from catches during surveys (Table 3), were as follows:

Deep sea sharks (*Haploblepharus* sp., *Scoliodon* sp., *Sphyrna* sp., *Squalus* sp., and *Squatina* sp.).

Big eyes (*Priacanthus* sp.).

Deep sea lobsters (*Puerulus* sp.).

Spike fishes (Triacanthodidae).

Deep sea prawns (*Acotes* sp., *Aristeus* sp., and *Heterocarpus* sp.).

Threadfin bream (*Nemipterus* sp.).

Lizard fishes (*Saurida* sp.).

Cardinal fishes (*Apogon* sp.).

Mackerels (*Rastreiiger* sp.) and

Sea robins (*Peristedion* sp.).

In the 300—600 m depth range, the predominant species (each 2.5% to 10% of the total) were as follows:

Green eyes (*Chlorophthalmus* sp.).

Deep sea prawns (*Acetes* sp., *Ariteus* sp. and *Heterocarpus* sp.).

Spike fishes (Triacanthodidae).

Sea robins (*Peristedion* sp.).

Big eyes (Priacanthidae).

Glow bellies (*Acropoma* sp. and *Synagrops* sp.).

Lizard fishes (*Saurida* sp.).

Man-of-war fishes (*Cubiceps* sp., *Psenes* sp., and *palinurichtus* sp.).

Deep sea sharks (*Haploblepharus* sp., *Scoliodon* sp., *Sphyrna* sp., and *Squatina* sp.) and

Duck bill eels (*Nettastoma* sp.).

Generally, each species group tends to show significantly unequal percentages for the two depth ranges. However, groups such as big eyes (Priacanthidae), Lizard fishes (Synodontidae), deep sea sharks and deep sea prawns show compositions of $\geq$ 10%, for certain countries (Table 3).

It is noted that the number of species recorded tends to increase with the number of tows made in an area. The numbers of species are very different for the countries of the region — perhaps because the number of tows varied (Table 2). As such, the percentage values for each species will tend to be greater for areas with fewer recorded species than for areas with more recorded species. For this reason, subdivision of the predominant groups has not been attempted according to the percentage values exhibited. The groups with $\geq$ 5% representation in the trawl catches of any one or more countries have been arranged in alphabetical order, as their dominance was not similar in all the countries (Table 3).

Some of the finfish groups mentioned above are of commercial value at present and perhaps the deep sea prawns and lobsters can be included in that category.

Many of the species groups which are common in depths less than 100 m are also found in the 100—300 m depth range but form only a small percentage of the total.

Big eyes (Priacanthidae) and deep sea prawns (particularly *Aristeus* sp. and *Heterocarpus* sp.) have been observed in the deep waters of all the countries in the project area. Most of the other predominant demersal groups have been recorded in a majority of the countries (Annexure 1). Probably these may also occur in all the countries but have not been recorded because of insufficient coverage and low intensity of sampling in the deep waters.

There were two families of mesopelagic fish recorded – Myctophidae and Gonostomatidae, but species identification was incomplete. Myctophidae *(Myctophum* sp.) was distinctly more common and appeared in the pelagic trawl catches off Maldives, Sri Lanka, Bangladesh, Burma and Indonesia, whereas Gonostomatidae was recorded only off Bangladesh.

5.2 Catch rates

The mean catch rates (kg/h) of 26 species groups are illustrated by geographical location, depth range and season in figures 3—22. These species groups were also categorized into four groups, according to their commercial importance i.e.,

1. Highly valuable species group (Figures 3—8).
2. Valuable species groups (Figures 9—16).
3. Less valuable groups (Figures 17—18) and
4. Uncategorized species groups (19—22).

The figures are meant to be self explanatory. Whenever information provided for the east coast of India is considered, it must be borne in mind that the vessels used and the trawl gear design are different from those used in other countries. Though the vessel and trawl design were the same for all the other countries, the size of the bottom trawl used in Sri Lanka and Bangladesh was smaller than that used on the eastern side of the Bay.

5.3 Environmental conditions and catch rates

Figure 24 shows the ranges of five environmental factors within which the catch rate (median) of 11 species groups is higher than 25 kg/h.

Box-and-Whiskers plots for spectrum of optimum environmental conditions are given in Figures 24 (temperature), 25 (salinity), 26 (dissolved oxygen) and 27 (depth). For these spectrums, 2—4 groups (or categories) are established depending upon different ranges. For example, in the case of temperature spectrum (Figure 24), three groups were considered:

(1) Groups in lower temperature range (12—16°C)such as deep sea sharks, Nomeidae, Gempylidae, Chlorophthalmidae Triglidae, deep sea lobsters/prawns and Myctophidae.

(2) Groups in high temperature range (1 9—27°C) such as crabs and Synodontidae.

(3) The group in both low and high temperature ranges (14—25°)such as Priacanthidae.

Likewise, groups in other spectra (salinity, dissolved oxygen and depth) can be observed in Figures 25, 26, and 27 respectively.

5.4 Relationship among environmental factors

289 sets of data on temperature, depth, salinity and dissolved oxygen in the 1 00—600 m depth zone were analyzed to see if any two of these factors were correlated.

For temperature (T) v/s depth (0), the quadratic regression exhibited very high correlation (r^2=92.9%), as shown in Figure 28. For salinity (5) v/s Depth (D) also, the quadratic regression showed fairly high correlation (r^2=68.3%) (Figure 29). In the case of dissolved oxygen v/s depth, there was no strong correlation, but a weak trend of negative linearity was observed (Figure 30). For T—S (Temperature-salinity) relationship, the cubic regression indicates high correlation (r^2=78.5%) (Figure 31).

6. DISCUSSION

Someavanshi and Joseph (1983) stated that, "Several small but trawlable grounds rich in deep sea fish resources have been located beyond the 200 m depth, which dispels the popular belief that good trawling grounds are not available in deeper waters along the East Coast". The same may be said in respect of many other areas around the Bay of Bengal. According to Table 1, nearly 20% of the area of the 100—600 m depth belt around the Bay of Bengal may be trawlable,

Although there may be considerable imprecision regarding bottom conditions due to allowances for navigational errors, untrawlable bottom conditions (rough and steep), surprisingly, tend to produce high catch rates for half of the species groups investigated (Chlorophthalmidae, Gempylidae, Synodontidae, deep sea lobsters and deep sea sharks). Catch rates for other species groups in those bottom conditions are unknown due to lack of data. Perhaps fisheries should be also considered even on untrawlable bottoms by developing new gears or by utilizing fishing methods such as bottom longlines, traps and handlines.

Many of the deep sea species groups such as threadfin bream, deep sea lobsters, deep sea prawns, lizard fishes, bulls eyes or big eye, cuttle fish and squids are well known to be edible. *Centrolophus* spp, *Cubiceps* and *Chlorophthalmus* spp also have been reported to be edible (Saetersdal and de Bruin 1978). Among the deep sea sharks, some spiny sharks found in 200—400 m depth and caught by hook and line have become economically valuable in Sri Lanka and India, because of their highly valued liver oil used in the manufacture of cosmetics. The commercial value of a few major species groups is uncertain and this may be the case with mesopelagic species also.

The occurrence of fish species and catch rates in the 300—600 m depth zone is significantly less than those in the 100—300 m depth. On the basis of the overall catch rates for all demersal species in the 100—600 m depth belt, the resources in the 100—300 m belt may be more than twice that in the 300—600 m belt. Ninan, Basu and Bhargava (1984), analyzing the results of their trawl survey on the east coast of India, also have shown that the trawl catch rates are very high in the 100—200 m belt. The intensity of the survey and the extent of the trawlable area and seasons covered are not sufficient for reliable estimates of the biomass. According to the R/V *Dr. Fridtjof Nansen* survey (Stromme, 1983) around the Maldivies, biomass estimates were 3000t deep sea prawns and 60,000 t for deep sea fish in the inter-atoll channels south of Male and 180 t for deep sea lobsters in the channel adjacent to the An atoll. But the catch rates for the deep sea prawns and lobsters around Maldives were much less than those obtained around Sri Lanka — which again was less than that reported for the grounds off Quilon in south-west India. (Saetersdal and de Bruin, 1978).

For mesopelagics, the surveys were too scanty to allow any biomass estimation. It is strongly felt that the potential resource of this group would be of significant magnitude. More specific surveys are required for better understanding of their distribution and biomass.

Uncertainties concerning the exploitable potential and the market values of the deep sea shellfish and finfish, in the light of the heavy capital investment on the vessel and equipment and the skilled crew required for such operations, have discouraged countries in the region from entering this fishery. The deep sea resources close to some of these countries may not be large enough to establish a separate fishery on them. For Burma, the fishery on the continental shelf may have to be developed further before venturing into the deep waters. Perhaps, operation on a multilateral or regional basis may be an approach to be considered.

Limiting the exploitation to the 200—300 m depth range where the resource is mainly concentrated may improve economic viability through use of relatively less expensive vessels and equipment than those required for coverage to 600 m depths. A commercially oriented operation to improve resource information, to conduct market surveys with the catches obtained and determine the economic viability of exploitation is called for.

Such an operation must also cover cheaper and passive fishing methods such as hooks and lines which, if technically feasible, would provide opportunities to the small-scale sector to benefit from these resources.

Though environmental data were obtained during four different years, 12 different months and different waters in six countries, strong correlations were observed between temperature v/s depth, salinity v/s depth and T—S relation with the large sample size (n=289). This implies that the structures of temperature and salinities do not vary much during a year in deeper waters. This also indicates that structures of temperature and salinity are not influenced by monsoons and surface ocean currents. Therefore, it is assumed that there may not be large movements or exchanges of water masses in any direction in the deeper waters.

Hence, it is believed that deep sea demersals do not move or migrate extensively and probably remain in these areas where environmental conditions are constant.

Dissolved oxygen is one of the most important and fundamental environmental factors in the ecosystem and the food chain. However, concentrations were rather low and constant (0.3—1 .0 ml/l) in deeper waters, and they didn't show significantly different ranges among the 11 species groups except in the case of Synodontidae (1.0—1.5 ml/l) which generally inhabits shallow waters where the density is higher. Therefore, in deep waters, dissolved oxygen concentration is not as important as other factors. In other words, deep sea demersals can inhabit waters even with lower density of dissolved oxygen.

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Table 3

Composition of species with >5% representation in the trawl catch in any one or more countries identified during the R/V Dr. *Fridtjof Nansen* **cruises in the Bay of Bengal.**

A: Depth range 100 – 300 m
B: 300 – 600 m

(in percentage)

	Maldives		Sri Lanka		Bangladesh		Burma		Thailand		Indonesia	
SpeciesName	A	B	A	B	A	B	A	B	A	B	A	B
Fin llsh												
Acropomatidae	–	–	–	31.1	10.0	–	5.2	–	–	–	–	–
Apogonidae	–	–	–	–	–	–	0.8	–	26.0	–	–	–
Carangidae	2.1	–	–	–	7.0	–	12.1	–	–	–	–	–
Centrolophidae	–	–	–	5.1	–	–	6.9	2.4	–	–	–	4.8
Chlorophthalmidae	5.2	–	–	5.1	–	–	1.7	15.3	–	28.2	–	–
Coryphaenidae	–	–	–	–	–	–	–	**2.4**	–	–	–	8.0
Nemipteridae	–	–	13.9	–	3.5	–	13.0	–	–	–	–	–
Nettasomatidae	–	–	–	–	–	–	0.8	15.2	–	–	–	–
Nomeidae	2.1	–	–	–	–	–	5.2	2.6	4.4	–	–	12.6
Paralepididae	5.3	–	–	–	–	–	0.9	–	–	–	–	–
Perciformes	–	7.0	–	–	–	–	15.6	–	–	–	–	–

Table 3 *(Continued)*

Species Name	Maldives A	Maldives B	Sri Lanka A	Sri Lanka B	Bangladesh A	Bangladesh B	Burma A	Burma B	Thailand A	Thailand B	Indonesia A	Indonesia B
Priacanthidae	5,3	—	2.4	—	13.8	—	0.8		17.4	—	11.6	35.5
Sciaenidae		—	13.9	—	3.4	—	0.8					
Scombridae						—	0.8		25.8			
Sphyraenidae		—	13.9									
Synodontidae	2.6	—	13.9	19.0	3.4	—	8.7					
Trachichthyidae										35,9	—	—
Triacanthodidae	18.0									—	21.4	—
Triglidae	2.7					—	2.4			35.9	21.4	—
Deep sea sharks	21.0			—	**8.2**	—	0.8	2.6		—	45.6	12.6
Skates & Rays								12.4				
Other Demersal Resources												
Deep sea crabs		—	2.5	**5.2**	**7.0**							
Deep sea lobsters	8.2	—	7.0	**5.2**	**20.9**		0.8		4.4	—	—	—
Deep sea prawns	8.2	—	9.3	19.0	3.4		5.2	11.5	8.8	—	—	22.5
Octopuses				10.3	—							
Squids/cuttlefish	9.1	—	16.2					2.6				
Others	10.2	—	—	—	17.4	—	8.9	28.5	4.4	—	—	4.4
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%