

VALUABLE LIVING RESOURCES FROM OUR SEAS

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Introduction

Sri Lanka being an Island has access to sea right round through a coast line of 1760 km. Sri Lanka declared its Exclusive Economic Zone (EEZ) in 1976 and the exclusive marine fishery rights was established over 516,000 sq km. This ocean area is a wealth to the nation with different kinds of living organisms ranging in size from microscopic planktons to huge marine mammals like whales. At present the valuable resources harvested from our seas are the fishery resources including fish and many other resources like shell fishes (prawns and lobsters) and mollusc (squid & cuttlefish etc.). Fish is the most important source of animal protein in Sri Lanka. It provides about 60% of the animal protein and about 13% of the total protein in the diet. Annual per capita consumption of fish has increased to about 17 kg in 1987.

Around 2500 MT consisting of highly valued fish products such as prawns, lobsters, cuttlefish, beche-de-mer, shark fins, shark liver oil are exported to countries such as Japan and those of EEC (European Economic Commission) each year.

Fisheries

Sri Lanka has been using the resources from the ocean since time immemorial. However, during the past few decades the fishing industry has undergone significant changes due to the development activities that has taken place particularly in the fisheries sector. Before the 1950's, the fishing in Sri Lanka was a traditional one, with beach seiners (Ma-del) as the main gear (Figure 1). This is a bag like net with long wing like structures attached to long ropes. The total length of the beach seine net sometimes exceeds 4 km. These are operated by flat bottomed log crafts called Madel Parus. In early 1950's there were about 10,000 such units operating right round the island. A large number of fish species are caught by this gear and the area of fishing is limited to the inshore waters within 2-4 km from the shore. Of the species caught by the gear the sardines (Hurulla and Salaya), Indian mackerel (Kumbalawa) Pony fish (Karalla), Anchovies (Halmessa), other small pelagic fish and the young ones of the large fish such as Seer fish (Thora) Queenfish (Kattawa) and Tuna (Balaya, Alagoduwa, Atawalla) were form the dominant groups (Figure 2). At that time, the production by this gear contributed to about 90% of the

total marine fish production. The other gear that contributed to the remaining 10% were the hand line, pole and line, gillnets and other stationary gear like stake nets, pound nets etc, operated mainly by the traditional crafts like log rafts (Teppam) and dug outs (Orus and Vallams).

A major change took place in the fishing industry in late 1950's, with the introduction of the mechanisation scheme. With the mechanisation, some of the traditional crafts were equipped with outboard engines and some new crafts with outboard and inboard engines were introduced. With these changes, fishermen could venture into a greater distance from the shore than before and as a result the fishing area as well as the efficiency of gear increased and the production from the marine sector boosted up. With the mechanisation, drift gillnet fishing became more popular and at present more than 90% of the marine production is taken by the gillnets. Gillnet is a wall of netting hanged in the water column and the fish of a particular size (which is determined by the mesh size of the net) get gilled (Figure 3). This is the most common gear now used in Sri Lanka for both small pelagic and large pelagic (Pelagic fish are those found in surface or near surface waters). At present gillnets are operated by traditional crafts like log raft (Teppam) and dugouts but the major production comes from the introduced crafts namely the 17'-22' FRP (Fibre Reinforced Plastic) and the 3.5 ton class of boats. The other important gear used at present are the long line, trolling line, pole and line, hand line (mainly used for tunas & large pelagics) (Figures 4 & 5) and purse seine (which is a developing fishery to catch mainly the small pelagics) (Figure 6). Beach seine fishing has declined due to the intense use of labour and high investment. In addition to these fishing methods trawling is being practised in certain areas (Mannar, Puttalam, Negombo etc.) targetting mainly prawns. In some areas (Negombo) these trawls are still operated by sail driven dug out (orus) and in Chilaw, Kalpitiya and Puttalam mechanised boats (3.5 t & 11 t boats) are used for trawling (Figure 7).

Among other fishing gear used in Sri Lanka are the bottom set gillnets, trammel nets, etc. which are used mainly for bottom fish like snappers, groupers and lobsters. As in other tropical fisheries, in Sri Lanka too, we have a multi-

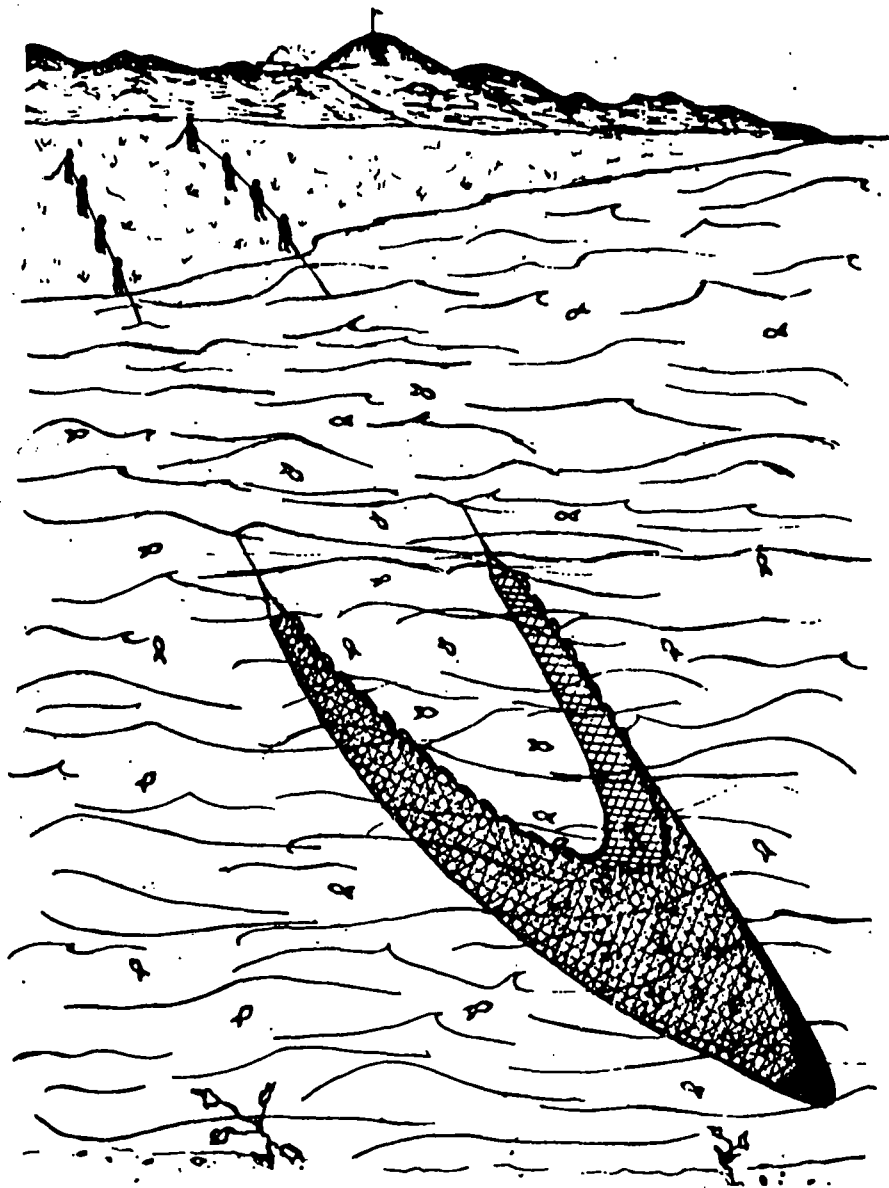
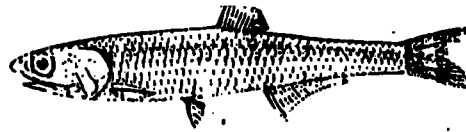


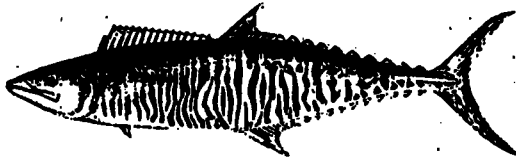
Figure 1: Beach seine operation - A traditional fishing method



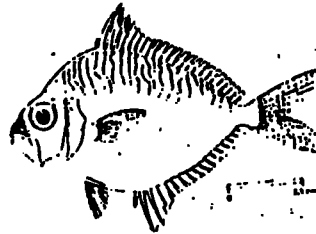
Amblygaster sirm (Sardine)



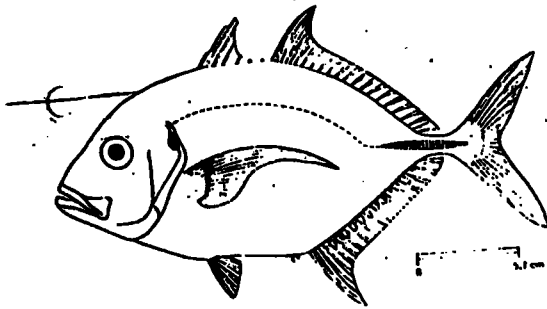
Stolephorus heterolobus (Anchovy)



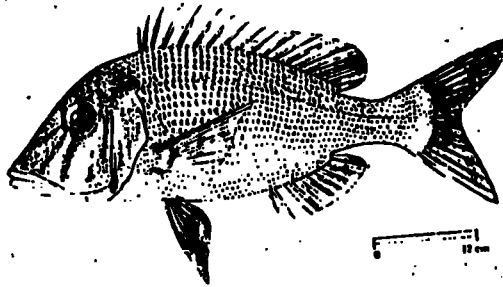
Scomberomorus commerson (Seer fish)



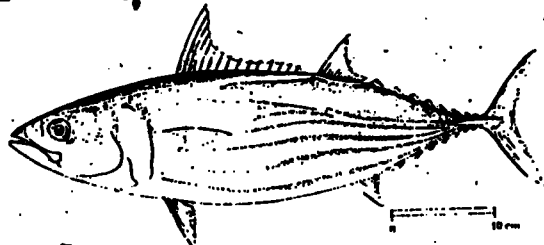
Leiognathus splendens (Pony fish)



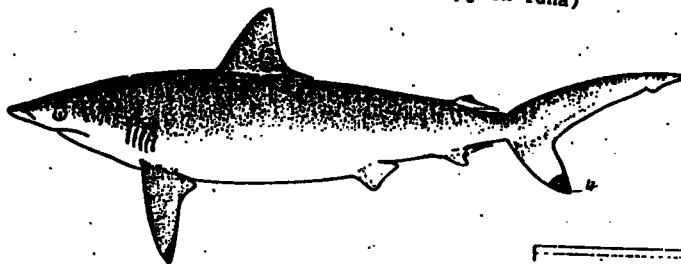
Carangoides malabaricus (Trevally)



Lethrinus nebulosus (Rock fish)

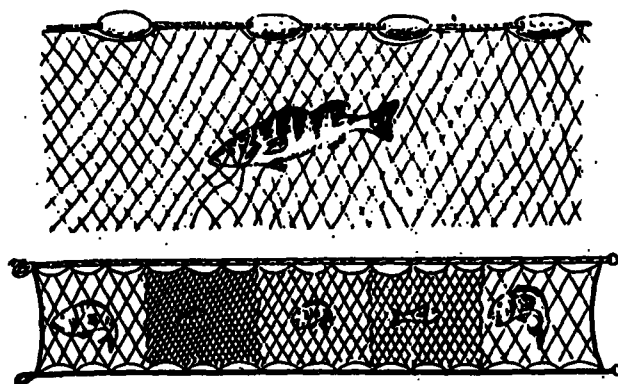


Katsuwonus pelamis (Skipjack Tuna)

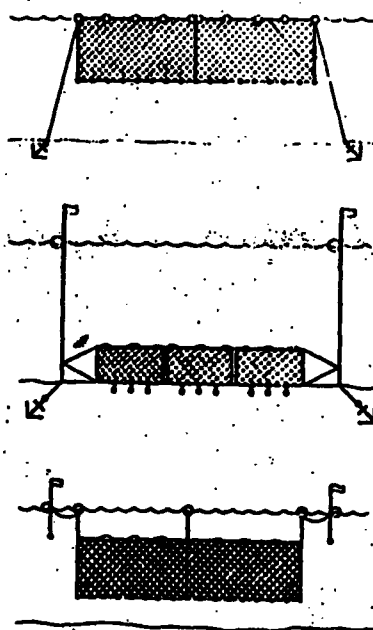


Caracharhinus sorrach (Shark)

Figure 2: Some commercially important marine resources from our seas.



The mesh size of a gillnet determines the size of the fish caught.



Gillnets can be used at the surface, midwater or on the bottom, either anchored or free floating, depending on the target fish.

Figure 3: . Gill nets - The most common fishing gear used in Sri Lanka.

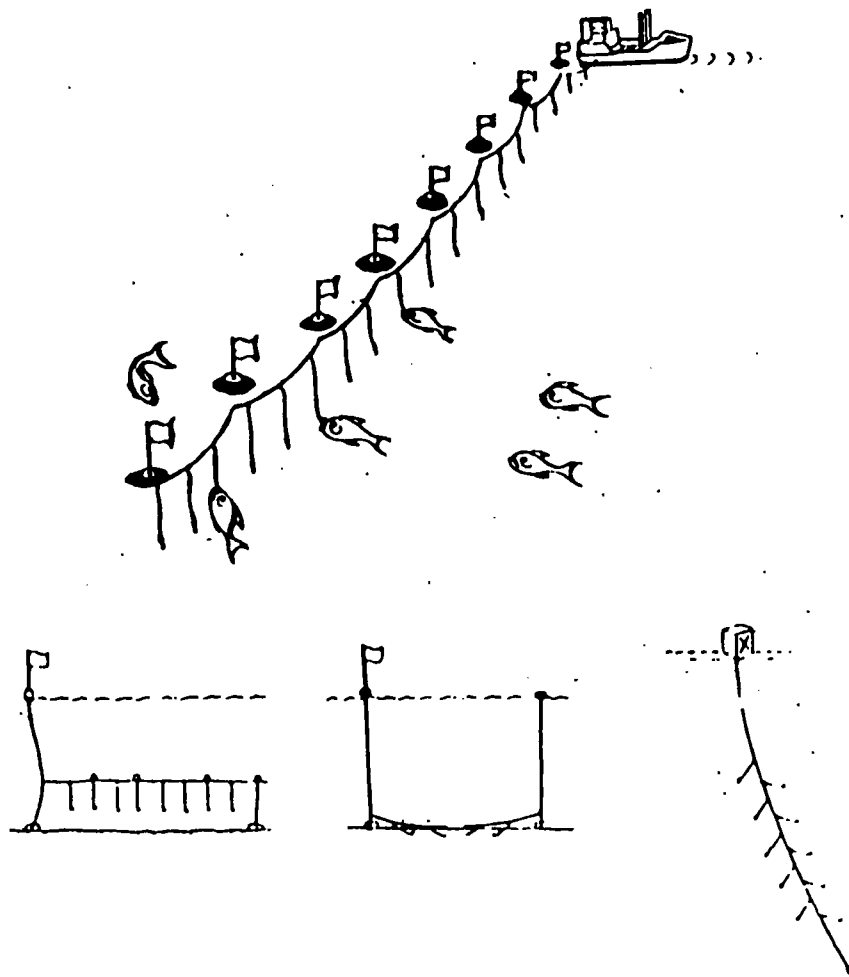


Figure 4: Longlines Used mainly for large pelagics in Sri Lanka.

Longlines of baited hooks can be deployed at the surface, midwater, at the bottom or vertically in the water column.

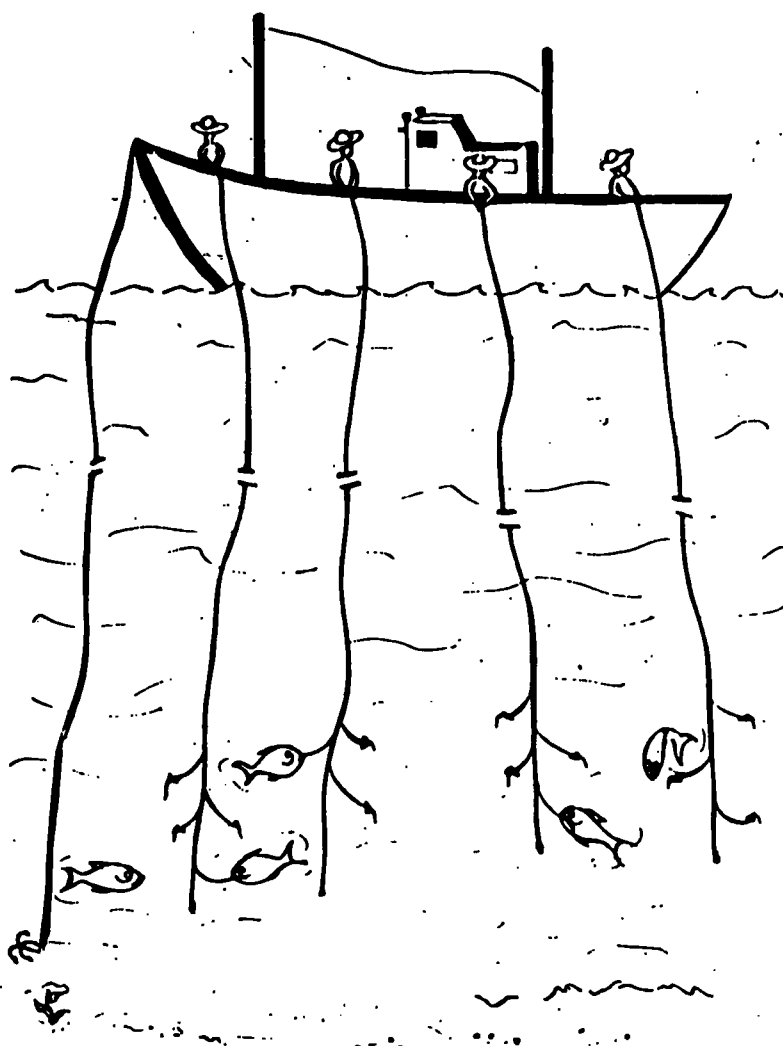


Figure 5: Handlines - A common gear to catch bottom fish. multiple baited hooks on a line can increase the catch.

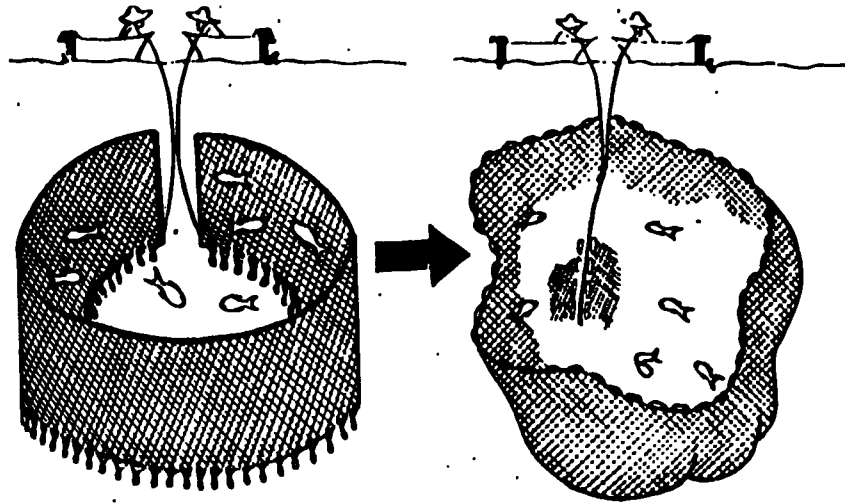


Figure 6: Purse seining - A recently developed fishing method targetting small pelagics.

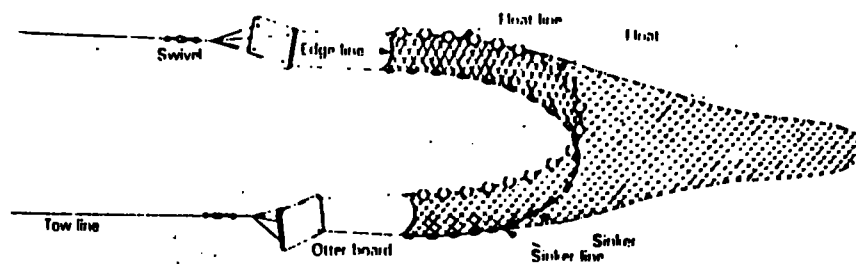


Figure 7: Trawl net with otter boards: targetting mainly Prawns.

species, multigear fisheries. That is in one particular gear more than one species are caught and that more than one gear is used to exploit the same species. Table 1 gives the type of craft and gear used in Sri Lanka with the recent statistics.

Table 1 : Type of Craft and Gear used in Sri Lanka

Craft	Gear	Number (1984)
1. Traditional crafts (Mechanised or non mechanised) Dugout canoes, Teppams, Ma-del Paru.	Drift Gill nets	14,387 (NM)
	Pole & Line	
	Troll Line	3757 (M)
	Hand Line Beach-seine Purse-seine	
2. 5-6.5 m Fibre glass boats	Drift Gill nets	
	Long line	
	Troll line	6882
	Hand line Purse-seine	
3. 9 m boats (3.5 ton) (Wooden & Fibre glass hulls)	Drift Gill net	
	Long line	
	Troll line	2829
	Hand line	
	Pole & Line Purse-seine	
4. 11 m boats (NW-AbuDhabi boats)	Drift Gill Net	
	Long line	80
		27,935
Other Gear -	Cast net	
	Trammel net	
	Bottom set gill net	
	Traps	

NM = Nonmechanised

M = Mechanised

Resources

Resources in our seas could be categorised into three major groups depending on the distance from the shore where they are found or the depth of the water column. They are

1. Coastal Resources (resources within the continental shelf region)
2. Offshore resources (resources in the offshore area from the edge of the continental shelf to a distance of about 100 miles from the shore)

3. Deep sea resources (resources in the deep sea > 200 M)

Coastal Resources

More than 95% of the marine production comes from the coastal waters and the commercially important groups are:

1. Small pelagics

These are the small inshore varieties. Over 30 species belonging to 8 families are utilised. Primarily harvested ones are the sardines (*Sardinella* spp.), anchovies (*Stolephorus* spp.), mackerel (*Rastrelliger kanagurta*) Indian scad (*Decapterus* spp.), Pony fish (*Leiognathes* spp.), small carangids, flying fish (*Exocoetidae*), half beaks (*Hemiramphidae*) and barracudas (*Sphyrna* spp.). With the increasing fishing pressure in the coastal area there is a general belief that Sri Lanka has now reached the maximum level of exploitation of the coastal resources. However, some coastal resources still remain underutilised. Among these are the cephalopod resources (squid and cuttlefish), half beaks (*Hemiramphidae*) and the sardines in the southern region.

2. Demersals

These are the species inhabiting the sea bottom or the waters near the bottom. About 215 demersal species belonging to 55 families have been identified around Sri Lanka. About 10 groups are predominant and commercially important. Of the most important ones are the emperor fish (*Lethrinidae*), snappers (*Lutjanidae*), Jacks Trevallies (*Carangidae*), groupers (*Seranidae*), grunts sweetlips - (*Pomadasidae*) and sea catfish (*Ariidae*). Trawling is the most important gear in catching the demersals followed by handline and bottom set gillnets. The northern part of Sri Lanka between 8° and 10° contribute to about 80% of the total demersal production. The most productive depth range is 20-60 m for valuable demersals.

3. Prawns

About 10 species of shrimps have been recorded among Sri Lanka commercial catches and five species make significant contribution. They are

White Prawn (*Penaeus indicus* & *P. merguensis*)

Green tiger (*P. Semisulcatus*),

Brown tiger (*P. monodon*)

and

Small prawns (*Metapeneus dobsoni*)

Trawling and bottom set gillnets are the most common gear used for catching prawns.

4. Lobsters

Six species of lobster (*Panilurus* spp.) are fished wherever reefs and rocky areas exist around the country. Trammel nets and bottom set gill nets are used to catch them. Due to the heavy demand from the tourist hotels and export market this resource has been intensively exploited. Their production has shown a decline from 2,560 t in 1977 to 608 t in 1986.

5. Cephalopods - (squid & cuttlefish)

In Sri Lanka, there is no major fishery for these varieties at present and the main contribution comes as incidental or bycatch of purse seine, beach seine, trawl fishery etc. Seasonally small artisanal crafts conduct night fishing in areas like Trincomalee, Dondra and Galle for squid with gas lamps and scoop nets. Following commercially valuable species have been identified.

Cuttle fish	-	<i>Sepia pharoonis</i>
„	-	<i>Sepia aculeata</i>
Squid	-	<i>Doryteuthis singhalensis</i>
Squid	-	<i>Loligo duvauceli</i>
Squid	-	<i>Notatodorus sloani</i>

6. Large Pelagics

The large pelagics found in the coastal waters on the west, south and east coasts of Sri Lanka are primarily the skipjack (*Katsuwonus pelamis*), yellowfin tuna (*Tunnus albacares*), kawakawa (*Euthynnus affinis*), frigate tuna (*Auxis* spp.), king mackerel (*Scomberomorus* spp.), billfish (*Istiophoridae* and *xiphiidae*) and pelagic sharks (*carchardae* and *sphyrinidae*). Most of these species are highly migratory and are distributed in the offshore waters but show seasonal migrations towards the coastal area.

Offshore resources

These are the resources found in the offshore area - area beyond the continental shelf margin. In Sri Lanka these resources are harvested by a fleet of about seventy, 11 ton boats and about seven hundred 3.5 ton boats which are modified for multiday fishing. These boats remain in sea for about 6-7 days and sometimes reach as far as 150 miles from the shore.

The resources exploited at present are primarily the large pelagic like tunas, billfishes, pelagic sharks and oceanic

species of flying fish. Due to their highly migratory nature most of these fish stocks are shared by more than one nation. Not only the coastal states of the Indian ocean but other industrial fishing nations like France and Spain are engaged in fishing for these resources particularly in the western Indian Ocean. As the fishing in international waters outside the Exclusive Economic Zone (EEZ) too has an impact on these common resources, many coastal countries have shown concern over this and have made requests to FAO, to form a new body for tuna management in the Indian Ocean.

Deep Sea Resources

The only fishery that exists for the deep sea resources is the bottom set longline fishery for gulper sharks (*Centrolophorus* spp.) which is exploited for liver oil. This fishery is carried out in a depth of 200-300 m. Many other deep sea resources have been indentified by previous resource surveys. Of these the important resources are the deep sea lobsters (*Peulurus* spp.) and shrimps (*Aristeus* spp. and *Heterocarpus* spp.). Occurrence of deep sea cuttlefish and squids also have been indicated. However, all these varieties have no established market anywhere and hence the economic viability of exploiting these resources remains doubtful.

Present Production and Future Plans

The total marine production in Sri Lanka in 1989 was 157,411 tonnes. Of these around 60,000 t were small pelagics, 30,000 t large pelagics, 20,000 t demersal, 4700 t prawns and 660 t, lobsters. The national development fisheries plan have determined the following production targets.

Year	1991	1992	1993	1994
Coastal	153,570	159,794	166,102	172,746
Offshore	27,500	29,000	30,500	32,000
Deep sea	9,000	12,000	15,000	18,000
Total	190,070	200,794	211,602	222,746

It is hoped to achieve the targets by increasing the harvest from the unutilised or underutilised resources in the coastal area and by increasing the production from the offshore and deepsea areas by introducing more boats for offshore fishing. Due to the high capital costs and the technologically advanced vessels, equipment and skills required in the deep sea sector, the government has identified this sector as more suited for foreign collaboration.

Management of the Resources

The living resources in the sea are not unlimited. There is a maximum level at which one could exploit a resource on a sustainable basis. This is called the maximum sustainable yield or MSY. Many resource surveys carried out around waters of Sri Lanka have estimated the MSY levels of different stocks. To exploit the resources at the MSY level the existing fisheries is well monitored by a sampling programme conducted by the NARA scientists. Management of fisheries is done mainly by regulation of fishing

effort (no. of boats engaged in a particular fishery), mesh size and the fishing areas. The stock assessment studies carried out by the fishery biologist are of immense use to understand the present level of exploitation of the resources. To increase the production from out seas the under-utilised and unutilised resources have to be harvested and the optimally utilised resources have to be well managed.

A well managed fishery would keep generations fed with fish as a source of animal protein.