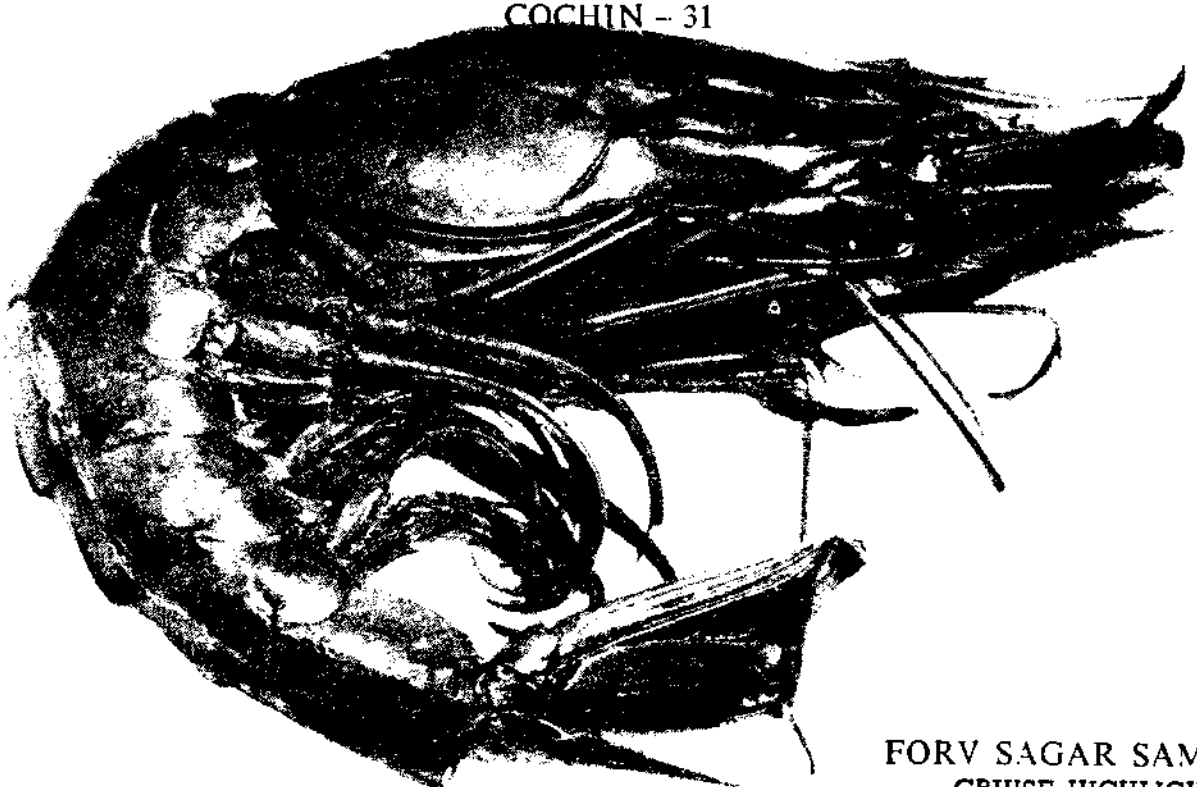
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN - 31



FORV SAGAR SAMPADA

CRUISE HIGHLIGHTS

JAN 1985 to SEP 1986

FOREWORD

The Central Marine Fisheries Research Institute, Cochin has been identified as the nodal organisation by the Indian Council of Agricultural Research, New Delhi to manage the scientific programmes of the Fishery Oceanographic Research Vessel, Sagar Sampada, owned by the Government of India (Department of Ocean Development).

The vessel, equipped for collection of marine fisheries resources, oceanographic and meteorological data in the Exclusive Economic Zone of India, started regular cruises from January 1985 and completed 20 cruises by September 1986 off the east and west coasts.

The highlights of results of these cruises are briefly mentioned in this brochure. It is hoped this information would help in augmenting marine fisheries resources of the country.

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RESEARCH INSTITUTE

COCHIN - 31
20-10-1986

COVER PICTURE : FLESIOPENAEUS EDWARDSIANUS

FORV SAGAR SAMPADA - HIGHLIGHTS OF RESULTS

The following is a brief account of the salient features of the vessel, her capabilities and highlights of the results of operations carried out during the 20 cruises conducted from January '85 to September '86.

VESSEL AND HER CAPABILITIES

FORV Sagar Sampada (OAL 71.50m) is essentially a stern trawler designed for research on the living resources and the environment in the Exclusive Economic Zone of the country and the contiguous ocean areas.

The vessel can conduct multi-disciplinary studies using latest generation equipments supported by a computer system.

Cruising range of the vessel is 18,000 n. miles at a speed of 12 knots.

Navigational equipments other than the normal complement include satellite navigator, and automatic visual direction finder. Navigational data can be coded with the electronic data Processing system.

Accommodation is for a total complement of 59 persons including 12 scientists.

Fishing capabilities include bottom trawling, midwater and pelagic trawling and also long lining. The vessel, in addition to manual control from the deck has an auto trawl system to electrically control shooting, trawling and hauling of fishing nets from the bridge.

There is a helicopter pad and hangar at the stern.

Laboratory and research facilities include a common laboratory on the main deck (Deck 4) for physical, chemical and biological work. A rosette array of 12 water sampling bottles are used to collect water samples for hydrographic studies. The system is linked to the computer facility. The various parameters like temperature and conductivity against depth can be read on the display screen and also can be recorded on diskettes for future use.

Wet and dry fish laboratories and aquarium are located below (Deck 3). Catch from the deck are passed on through the deck hatch and conveyor system to the wet fish laboratory.

The aquarium has twelve 300 l capacity tanks supplied with sea water from the inlet in the bow of the ship, with also a reservoir tank of 4m³ capacity. Aquarium can be used as a closed recycling system or open flow-through system.

There is a plankton winch on port side for biological oceanography work.

Acoustic detection and electronic data processing rooms with the computer are located above (Deck 6). The electronic data processing is a master facility used as a service centre for all data collected in other laboratories by the six desk top computers.

The Radio isotope laboratory equipped with a Geiger counter and monitor, is located on deck 3.

Meteorological data monitoring room is located on deck 6, where weather chart is obtained by facsimile recorder through satellite communications and radio transmission. There is also a meteorological telemetry buoy (WADI buoy) with sensors connected to computers through VHF station for measuring wind speed and direction, water and air temperature etc.

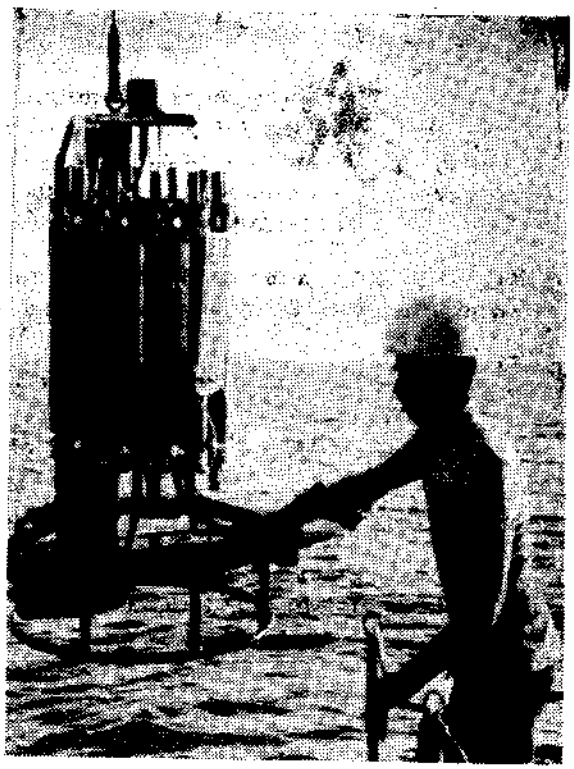
Acoustic instrumentation comprises of 3 scientific echosounders of frequencies 12,38 and 120 kHz of which one is connected to an integrator for quantifying densities. Print - outs of basic data are obtained through the computer system. There are photographic and reprographic facilities on board.

Management of the vessel:

The Central Marine Fisheries Research Institue (ICAR) is the nodal Agency responsible for the planning and execution of the various scientific programmes of FORV Sagar Sampada, in consultation with a Committee formed for the purpose.

The vessel is maintained and run by the Shipping Corporation of India on behalf of the Department of Ocean Development. Apart from the major participation in the scientific programmes of the vessel by CMFRI and, CIFT, other concerned institutions and Universities are also encouraged to make use of this national facility.

The CMFRI fills the positions of the deck officers and almost all the crew for the fishing and support for scientific equipment operations



Rosette, water sampler

during the cruises. Recruitment of the permanent complement for this work is under way.

Programmes executed:

The vessel conducted 20 cruises from February, 1985 to September, 1986 spending 396 days at sea and covering a track distance of 105250 km (56708 n.m).

The Exclusive Economic Zone of the country including the Laccadives archipelago and the Andaman sea were surveyed by the vessel. The equatorial waters were surveyed for the oceanic resources.

The technical programmes carried out included the following, using different equipments indicated.

Hydrography	– Rossette array of water samplers.
Plankton	– 'Bongo 60' net
Deep scattering layer	– Issac kid mid water trawl
Productivity	– C-14 technique
Fish distribution	– Acoustic surveys with Echosounders.

Autoanalyser for sea water analysis

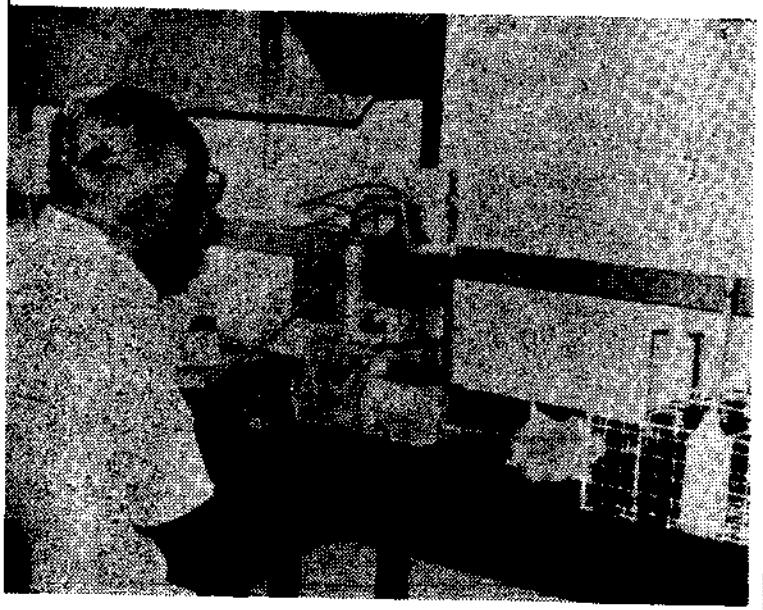
sonar and echo-integrator.
- Fishing with pelagic trawl and bottom trawls.

Meteorology - Automatic weather recorder and 'Wadi Buoy'.

The details of stations occupied during the afore-mentioned 20 cruises are as follows:

Rosette casts	–	690
Plankton	–	678
Issac Kid midwater trawl	–	630
Midwater trawl	–	210
Bottom trawl	–	126

Acoustic surveying was conducted by continuous operations of the sounders during the cruises.



Titration equipments on board

Meteorological telemetry buoy (Wadi buoy)

User Agency Participation in the cruises of FORV Sagar Sampada during the first 20 cruises from Feb. '85 to Sept. '86.

Sl No.	Name of Agency	Scientist man days
1.	Central Marine Fisheries Research Institute	3003
2.	Central Institute of Fisheries Technology	579
3.	National Institute of Oceanography	98
4.	Zoological Survey of India	86
5.	Space Application Centre	43
6.	National Physical Oceanographic Laboratory	51
7.	Fishery Survey of India	72
8.	Indian Institute of Technology, Madras	20
9.	Konkan Krishi Vidyapeeth	30
10.	Fisheries College, Mangalore	24
11.	University of Cochin	109
12.	University of Kerala	50
13.	Fisheries College, Tuticorin	12
14.	Annamalai University	107
15.	University of Madras	44
16.	Andhra University	47
17.	Berhampur University	28
		4781

In addition, 18 participants (IOC/UNESCO/DOD workshop on Ocean Engineering, Madras, March - April '86) from different nationalities – Egypt, Malaysia, Indonesia, Pakistan, SriLanka, Turkey, Iran, Phillippines, Thailand, Tanzania, Malagache, Mauritious, West Germany and India– had a training cruise off Madras on 16th March 1986.

Trawl net with a bumper catch

HIGHLIGHTS OF RESULTS

FORV Sagar Sampada conducted few trial cruises in January 1985, off Cochin, and after this launched the regular programmes of fishery resources survey in the EEZ, along with studies on the environment.

One of the important findings during the cruise in January '85 on the S.W. coast was the location of deep sea prawns, **plesiopenaeus edwardsianus** and **Acanthephyra** sp. at a depth of 870 m off Trivandrum. The former is the first authentic record of this very large sized species from this region.

The coverage made in February '85 in the Cochin-Goa sector caught the cuttlefish, **Sepia pharaonis** from depths 54-240m. The gudgeon, **Cheilodipterus** sp. and the bulls eye, **Priacanthus hamrur** dominated the catches from deeper waters. Among the mesopelagic fishes the lantern fish, **Diaphus splendidus** formed the major component.

During the cruise in February - March '85 on the N.W. coast, large number of fish eggs and larvae were observed over the Angria Bank,

Fish catch on deck

suggesting that several species of fishes spawned in the area at this time. Spawning ground of ribbon fish (**Trichiurus haumela**) at 47 m depth off Veraval was indicated. Similarly, a nursery ground for juvenile **Lactarius sp.** at 100 m depth off Okha was observed. Low surface temperature profile in the northern latitudes of the area surveyed was associated with large swarms of pelagic tunicates and poor fish biomass.

The survey in April '85 on the SW and SE coasts showed that the demersal fish components of the S. W. coast were mainly lizard fishes (**Saurida** spp.), threadfin breams (**Nemipterus** spp.), scads and squids and of the S. E. coast, threadfin breams, silver bellies **Leiognathus** spp. and the silver biddy **Pentaprion** sp. The pelagic resources taken were composed of red shrimps, oceanic squid (**Symplectoteuthis oulaniensis**, light fishes (Gonostomatids), lantern fishes (Myctophids) and the swarming oceanic crab, **Charybdis edwardsii**, the latter particularly from the S. W. coast. The upper layers of water over the Wadge Bank were cooler as compared to that of Pt. Calimere – Madras region.

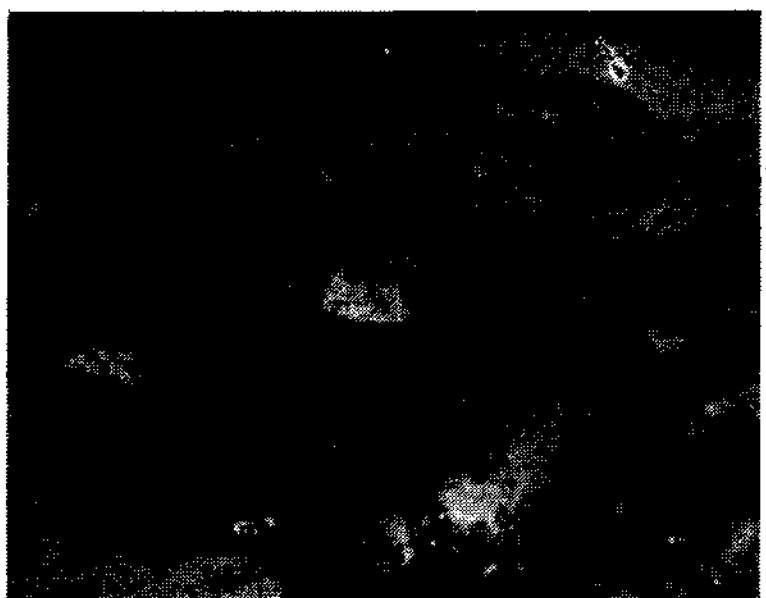
Catch of deep sea prawns and lobsters

In July '85 acoustic survey indicated abundance of whitebait (**Stolephorus** spp.). In the Gulf of Mannar at 40–41 m depth. A good resource of trumpet fish (Family : Macrorhamphosidae), and the deep sea lobster(**Puerulus sewelli**) were located at 200 m depth on the Wadge Bank. Extensive swarms of oceanic crab were noticed at 80 m depth off Anjengo. This survey also indicated good catfish concentrations at 50m depth off Cochin.

The monsoon cruise in July '85 off the S W. coast revealed the abundance of bulls eye off Cape Comorin. The oceanic crab was the important component in the pelagic trawl collections, which also included juveniles of squids and prawns such as **Hymenopenaeus** sp. and **Pasiphaea** sp. Mesopelagics included the lantern fishes **Diaphus** and **Myctophum** and prawns (Family : Pasiphaeidae) in the southern sector and tunicates, euphausids, siphonophores and crustacean larvae in the northern sector.

The cruise which covered the EEZ off the central sector of the west coast in August '85 sighted large tuna shoals off Goa (69° 00 E–70° 00'E) along the 15° N lat. in the oceanic waters. Simila-

rly shoals of flying gurnards (**Dactyloptena orientalis**) were also noticed in the area. Several species of juvenile fishes, eel larvae, oceanic crabs and **Acetes** sp. were also located during this cruise.



Catch of squids and cuttle-fishes

Survey of the North west coast in September '85 showed that the demersal resources included lizard fishes, ribbon fishes, threadfin breams, the king fish (**Rachycentron** sp.) and cuttle fishes in 88-93m depth. Jellyfish, lantern fishes, light fishes and juvenile squids formed the important components in the mesopelagic catches. Fish larvae were present in 75% of the zooplankton samples.

The coverage of the north west sector, Kandla-Ratnagiri in October '85 indicated the presence of oceanic squid mainly in the off shore waters between Bombay and Goa. The demersal resources included bulls eye, lizard fish, threadfin bream and several species of cuttle fish belonging to the genus **Sepia**. Large number of fish larvae and juveniles were collected. Tuna shoals, accompanied by flocks of birds, were sighted north of Goa.

Survey of the Goa-Cochin sector by end of October '85 indicated good concentrations of

surface fish shoals at 250–320 m depth south-west of Goa. Tuna shoals were sighted southwest of Mangalore. Biomass was found to be higher in the nearshore waters than in the oceanic waters. Salinity was higher north of 13° N compared to the southern area.

The survey of the outer continental shelf and slope of the entire west coast in November '85 located the abundance of phyllosoma larvae of lobsters in the offshore waters (around 75m depth) off Kerala and Karnataka coasts. Among the dominant species of pelagic fishes caught were **Cubiceps** sp., **Psenes indicus** and juveniles of carangidsi, catfish, threadfin bream, ribbon fish and bulls eye dominated the demersal catch.

During the survey of the Laccadives archipelago in Dec'85–Jan'86 period, concentrations of young ones of tunas, bill fishes, wahoo (**Acanthocybium** sp.), carangids, lutianids, flat fish (**Psettodes** sp), leiognathids, balistids and **Polynemus** sp were found.

In the survey of the equatorial region of the Indian ocean (03° 00'N to 03° 00'S; 76° 00' E to 86° 00'E) in Jan–Feb. '86, lantern fishes formed the major group in the pelagic trawl, forming 57% of the catch. Large squids (**Ancistrocheirus lesueuri**) weighing about one kg or more were seen in some of the hauls along with young ones of other oceanic squids.

During the cruise on the east coast covering pt. Calimere to Paradip in Feb–March '86, it was found that perches, carangids, **Pentaprion** sp. and goat fishes (**Upeneus** sp.) had wide distribution in the area. In pelagic trawl lantern fishes constituted 35-95% in 75% of the stations.

Survey of the shelf and slope waters off Madras coast in late March revealed dense concentrations of the oceanic crab, almost all of them females, in berried condition.

The cruise which covered the eastern Bay of Bengal and Andaman waters in March–April '86 found the thermocline at 75–100m. Several well known mid and deep water species of fish, prawns and cephalopods were encountered in the catches.

The cruise in the upper Bay of Bengal in May 86 apart from locating the concentrations of different commercial fishes, such as cat fish,

mackerel, bulls eye and scads, also found squids and alima larvae of squilla in good numbers.

In June '86 in the lower Bay of Bengal, lantern fishes and light fishes as well as the usual community of deep water fishes were encountered in abundance. Some rare species of deep sea fishes like **Astronesthes** sp. and **Benthodesmus** sp. were located during this cruise.

The cruise during late June'86 located abundance of fish larvae in areas around 20m depth along the S W coast. Alima larvae were very common in the offshore waters in the region.

Along the central west coast, occurrence of young ones of several species of fish, squids and prawns were recorded in the first half of July '86. Thermocline level was at about 40 m depth.

The survey covering the Laccadives archipelago in July-August '86 revealed the presence of a dominant oceanic squid component in the catches and wide spread occurrence of young tunas. Thermocline depth was at about 65m.

Acoustic survey in Aug-Sept '86 revealed good pelagic and bottom fish recordings in the Gulf of Mannar, western side of Wadge Bank, and off Calicut and Mangalore. Good aggregation of whitebait was located off Manapad in Gulf of Mannar. Many surface tuna shoals were recorded in the oceanic waters, south of the Bassas de Pedro Bank. Very dense concentrations (1-9 tonnes/hour) of threadfin bream, cuttle fish and squids were located on the western Wadge Bank and between Mangalore and Calicut. Good recordings of Bulls eye were observed off Marmagoa. Entire shelf was covered with low oxygen cold upwelled waters upto 30m depth and the distribution and abundance of threadfin bream, bulls eye, and cephalopods appear to be related to the hydrographic conditions prevailing.

HIGHLIGHTS - IN A NUTSHELL

- First authentic record of the large deep sea prawn **Plesiopenaeus edwardsianus** at 870 m depth off Trivandrum.
- **Location of:** spawning ground of several species of fishes over the Angria Bank.
- Spawning/nursery grounds of ribbon fish off Veraval at 47 m depth.
- Nursery ground of young **Lactarius** 100 m depth off Okha.
- Extensive swarms of oceanic crabs along the SW coast during the SW monsoon season.
- Large tuna shoals during post monsoon time off Central west coast.
- Abundance of lobster larvae in the offshore waters (75 m) along Kerala-Karnataka coast in November.
- A variety of juvenile fishes, especially tunas, in the Lakshadweep area in Dec-January and July-August periods, and dominant oceanic squid component in July-August period.
- The presence of large quantities of lantern fishes in the lower Bay of Bengal and equatorial region during Jan - February period.
- Confirmation of the phenomenon of the seasonal concentration of whitebaits in the Gulf of Mannar during the SW monsoon season.
- Large concentrations of trumpet fishes at 200 m depth and very high concentration of threadfin bream (1-9 t/hr), cuttle fish and squids in the Wadge Bank in Aug-September period.
- The presence of large concentrations of berried oceanic crab during January-February along the SE coast.

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