केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान
(भारतीय कृषि अनुसंधान परिषद)
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
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F.NO. 11-17/2023(MANU)

11 Sept 2025

To
Yashaswi Fishmeal and Oil Company
Udyavara, Udupi

I am attaching herewith the report of the consultancy program on Fishery and stock assessment of small pelagic in purse seines along Karnataka coast, with your firm.

Regards

(Head)

अध्यक्ष / Head
भा.कृ.अनु.प.सी.एम.एफ.आर.आइ. मंगलूर क्षेत्रीय केन्द्र
Mangalore Regional Centre of ICAR-CMFRI

Consultancy project : Report on Fishery and stock assessment of small pelagic in purse seines along Karnataka coast. (Sept 2025)

Qualification and Training of enumerators for the collection of Marine fish landings data

The enumerators responsible for collecting marine fisheries landing data are recruited through an entrance examination conducted by the Indian Council of Agricultural Research (ICAR), New Delhi—an autonomous body under the Ministry of Agriculture and Farmers Welfare and the Department of Agricultural Research and Education (DARE), Government of India. The position is designated as Technician, and the minimum qualification required to appear for the examination is a graduate degree.

Shortlisted candidates are selected through an interview process and subsequently deputed to various ICAR institutes. After selection, they undergo training at ICAR-CMFRI, where they receive hands-on instruction in marine fish taxonomy, including identification of species landed along the Indian coast, characteristics of landing centres, types of crafts and gears operated, sampling methodologies, and the use of tablets for digital data entry.

Data sheets and monitoring protocols

Stratified Random Sampling Method for Marine Fish Landings

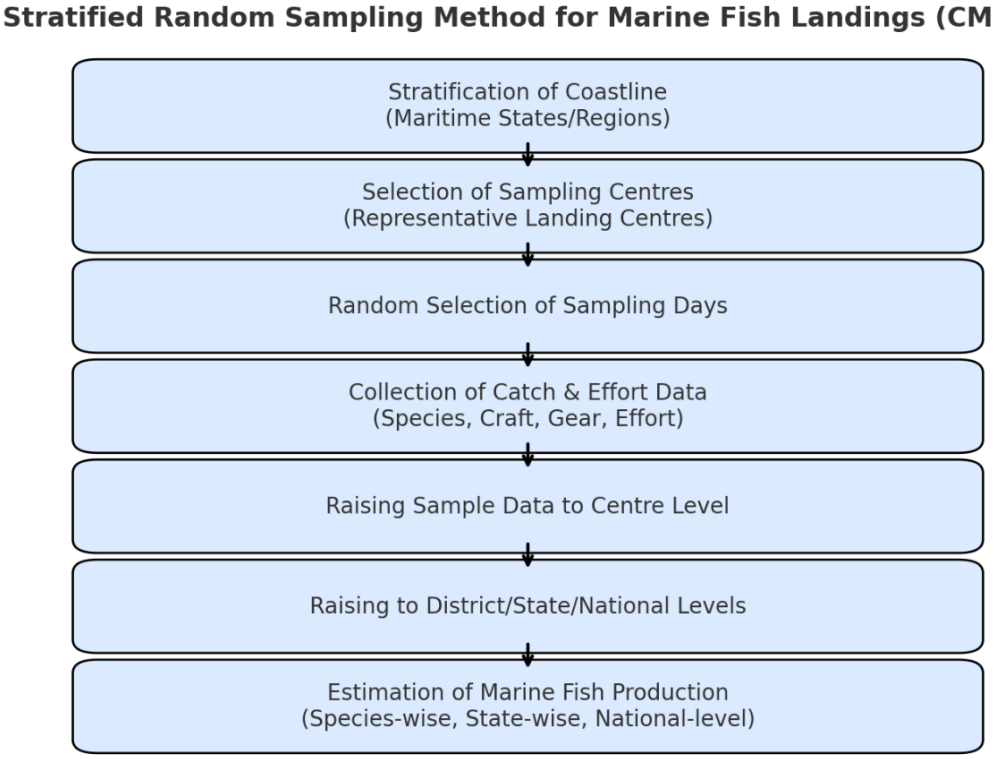
The **Central Marine Fisheries Research Institute (CMFRI)** developed and standardized the **stratified random sampling (SRS) method** for the estimation of marine fish landings in India. Under this methodology, the country's coastline is divided into strata based on maritime states and regions. Within each stratum, a representative set of landing centres is selected, and data on catch, effort, species composition, craft, and gear are collected through random sampling. This approach ensures statistically robust estimates of marine fish production at district, state, and national levels while minimizing bias and reducing the cost and effort of complete enumeration.

The landing data of the fishery resources along Karnataka coast is collected using stratified multi-stage random sampling technique from the major and minor landing centres. From 2017 onwards data collection is carried out using electronic tablets by providing login id/username to the survey staff, with centralized processing and retrieval of marine fish landings data at headquarters of ICAR-CMFRI, Kochi through the database server. Using the web application software for online data entry, the survey staff can directly record the information from

landings centers and can transmit the information to the server. The estimation of landings will be carried out at headquarters.

Steps in the Stratified Random Sampling (SRS) Method developed by CMFRI

1. Stratification of the Coastline
    - The Indian coastline is divided into maritime states and regions, which serve as strata.
    - Each stratum contains several fish landing centres of varying size and activity.
2. Selection of Sampling Centres
    - Within each stratum, a representative sample of landing centres is chosen.
    - The selection is based on the intensity of fishing activity, species diversity, and regional importance.
3. Random Selection of Sampling Days
    - For each selected centre, a calendar of sampling days is prepared.
    - A random number table (or software-based randomization) is used to choose the observation days, ensuring unbiased temporal coverage.
4. Collection of Catch and Effort Data
    - On the sampling day, enumerators record details such as:
        - Species-wise catch (weight and numbers)
        - Craft and gear type used
        - Fishing effort (number of units operated, trip duration, etc.)
    - Data are recorded digitally using tablets (tabs) for accuracy and faster transfer.
5. Raising of Sample Data to Centre Level
    - Since only part of the landings are observed, the sampled data are raised to represent the entire day's landing at that centre using raising factors.
6. Raising to District/State/National Levels
    - Data from sampled centres are extrapolated to represent all centres within a district and then aggregated at the state and national levels.
    - Statistical methods ensure that estimates are unbiased and representative of total landings.
7. Estimation of Marine Fish Production
    - Using this approach, CMFRI provides species-wise, state-wise, and national-level estimates of marine fish landings.
    - These data form the official source of India's marine fish production statistics, widely used for fisheries management and policy-making.



Biological sampling data base

In-situ samples collected from selected purse seines, ring seines and trawlers landed in Mangalore and Malpe

Fish samples were collected during January to May 2025 from the selected purse seine and trawlers and from January to August from the selected ring seines. Length, weight and maturity stages of each fish specimen collected were measured and the sex ratio was estimated.

Table 1. Length range, mean length, maturity stages and sex ratio of fishes sampled from selected purse seines.

S.No.	Species	Length range (mm)	Mean (mm)	Sex ratio (M:F)	Maturity stages (%)			
					Immature	Matured	Gravid	Spent
1.	*Sardinella longiceps*	119-187	146	1:1.2	7.5	47.3	0	45.2
2.	*Rastrelliger kanagurta*	101-268	205	1:1.3	7.9	15.1	11.9	65.17
3.	*Sardinella gibbosa*	78-194	160	1:1.5	4.9	5.4	1.6	88.0
4.	*Sardinella albella*	91-153	127	1:1.2	61.2	32.9	0	5.9
5.	*Megalaspis cordyla*	115-245	194	1:1.9	63.4	17.1	9.8	19.6
6.	*Decapterus russelli*	154-340	213	1:	1.5	23.9	0	74.6

Table 2. Length range and mean length of fishes collected from ring seines during January to July 2025

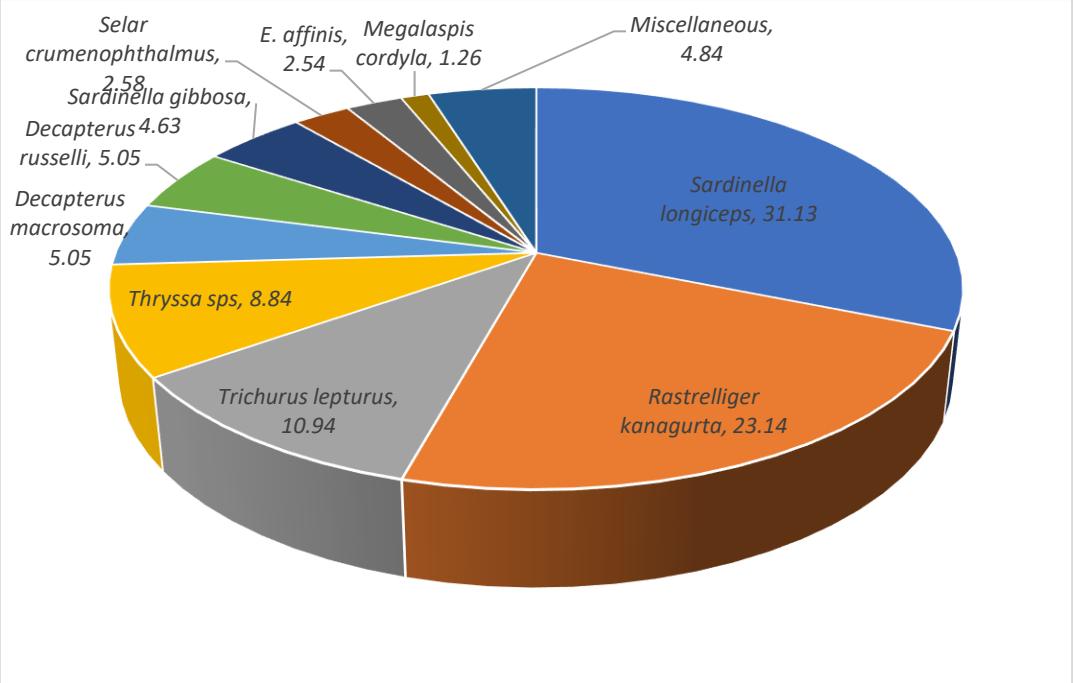
S. No.	Species	Length range (mm)	Mean (mm)
1.	*Sardinella longiceps*	119-187	154
2.	*Rastrelliger kanagurta*	136-205	166
3.	*Thryssa* spp.	85-181	152
4.	*Trichiurus lepturus*	145-285	268
5.	*Nemipterus japonicus*	112-126	119
6.	*Lesser sardine*	141-175	158

Table 3. Length range and mean length of fishes collected from trawlers during January to July 2025

S. No.	Species	Length range (mm)	Mean (mm)
1.	*Sardinella longiceps*	119-148	132
2.	Thryssa Sps	111-195	161
3.	*Decapterus russelli*	158-225	179
4.	*E. diacanthus*	121-179	152
5.	*Trichiurus lepturus*	193-396	273
6.	*Nemipterus japonicus*	90-310	151
7.	*Tenualosa toli*	135-162	146
8.	*Euthynnus affinis*	316-445	366
9.	*Lesser sardine*	141-194	162
10.	*Tenualosa ilisha*	196-216	208

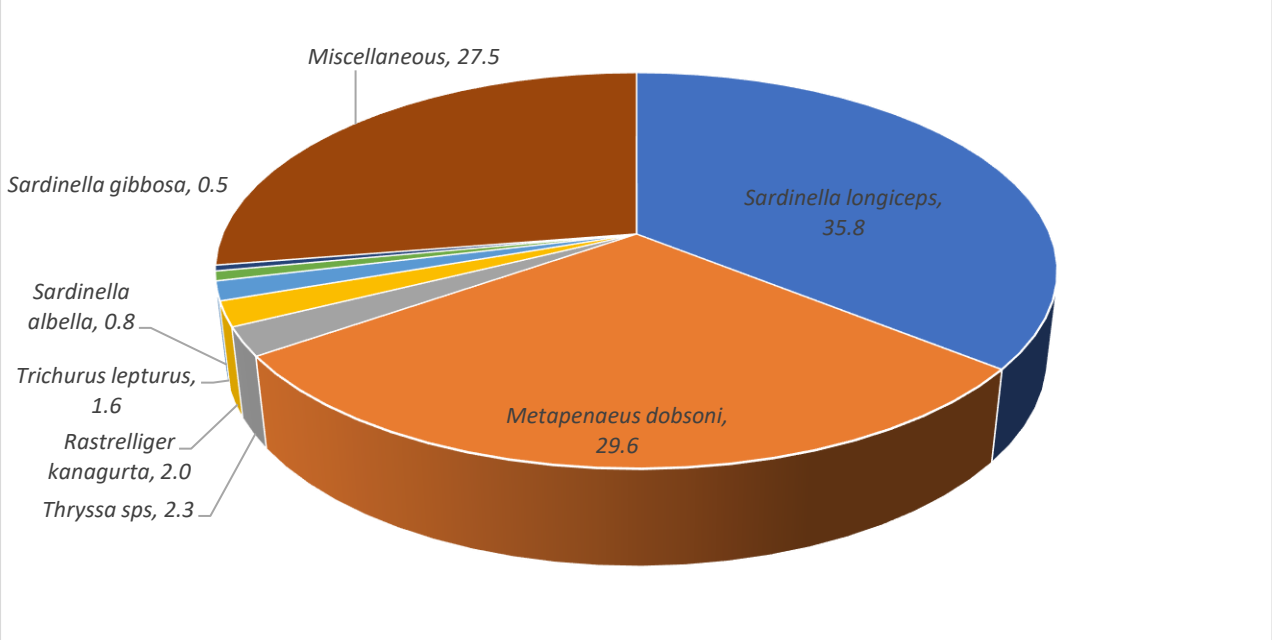
Species composition (%) of in-situ samples collected from purse seine

The major fishes recorded in the samples collected from selected purse seine boats during January to August 2025 included *Sardinella longiceps* (31.1%), *Rastrelliger kanagurta* (23.1%), *Trichiurus lepturus* (10.9%), *Thryssa* sp. (8.8%), Decapterus *macrosoma* (5.1%), *Decapterus russelli* (5.1%), *Sardinella gibbosa* (4.6%), *Selar crumenophthalmus* (2.6%), *E affinis* (2.54%), *Megalaspis cordyla* (1.26%) and miscellaneous (4.84%) includes *Mene maculata, Caranx sexfasciatus, Sphyraena putnamae, Lobotus surinamensis, Tylosurus crocodilus, Hemiramphus lutkei, Katsuwonus pelamis, Megalops cyprinoides* and *Sphyraena obtusata.*



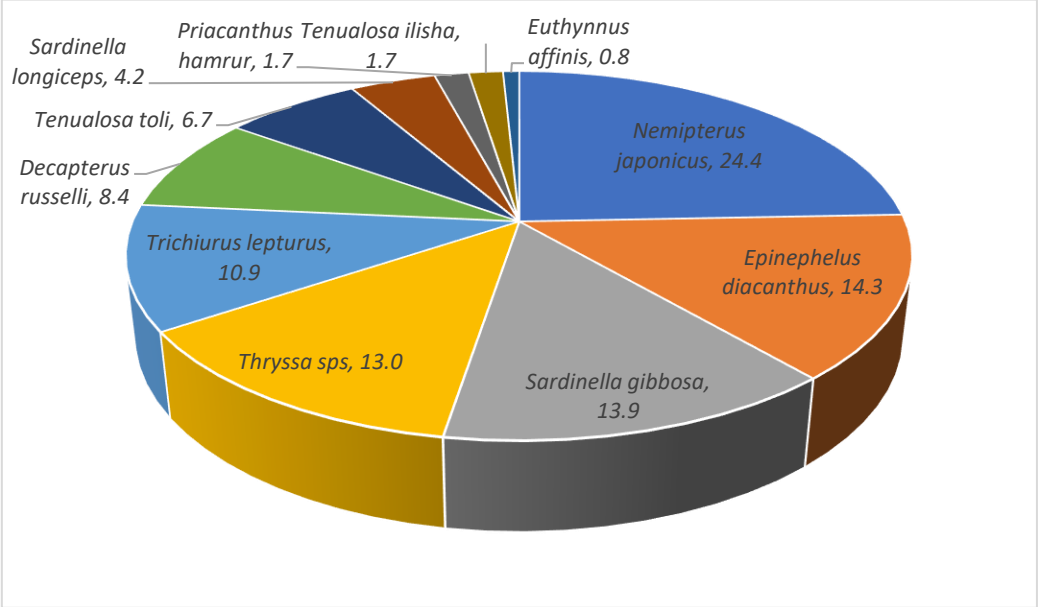
Composition of in-situ samples collected from ring seine

The major fishes recorded in the samples collected from selected purse seine boats during January to August 2024 included *Sardinella longiceps* (35.86%), *Metapenaeus dobsoni* (29.6%), *Thryssa* spp., (2.3%), *Rastrelliger kanagurta* (2.0%), *Trichiurus lepturus* (1.6%), *Sardinella albella* (0.8%), *sardinella gibbosa* (0.5%) and miscellaneous species (27.5%) which includes, *Lactarius, lactarius*, *Opisthopterus tardoore*, *Alepes djedaba*, *Stolephorus waitei, Secutor insidator, Tenualosa toli* etc.,



Composition of in-situ samples collected from Trawlers

The major fishes recorded in the samples collected from selected ring seine boats during January to May 2025 included *Nemipterus japonicus* (24.4%), *Epinephelus diacanthus* (14.3%), *Sardinella gibbosa* (13.9%), *Thryssa* spp. (13.0%), *Trichiurus lepturus* (10.9%), *Decapterus russelli* (8.4%), *Tenualosa toli* (6.7%), *Sardinella longiceps* (4.2%), *Priacanthus hamrur* (1.7%), *Tenualosa Ilisha* (1.7%) and *Euthynnus affinis* (0.8%)



Operational area

The details of the depth of operation and mesh size used by purse seine, ring seine and trawl are as follows

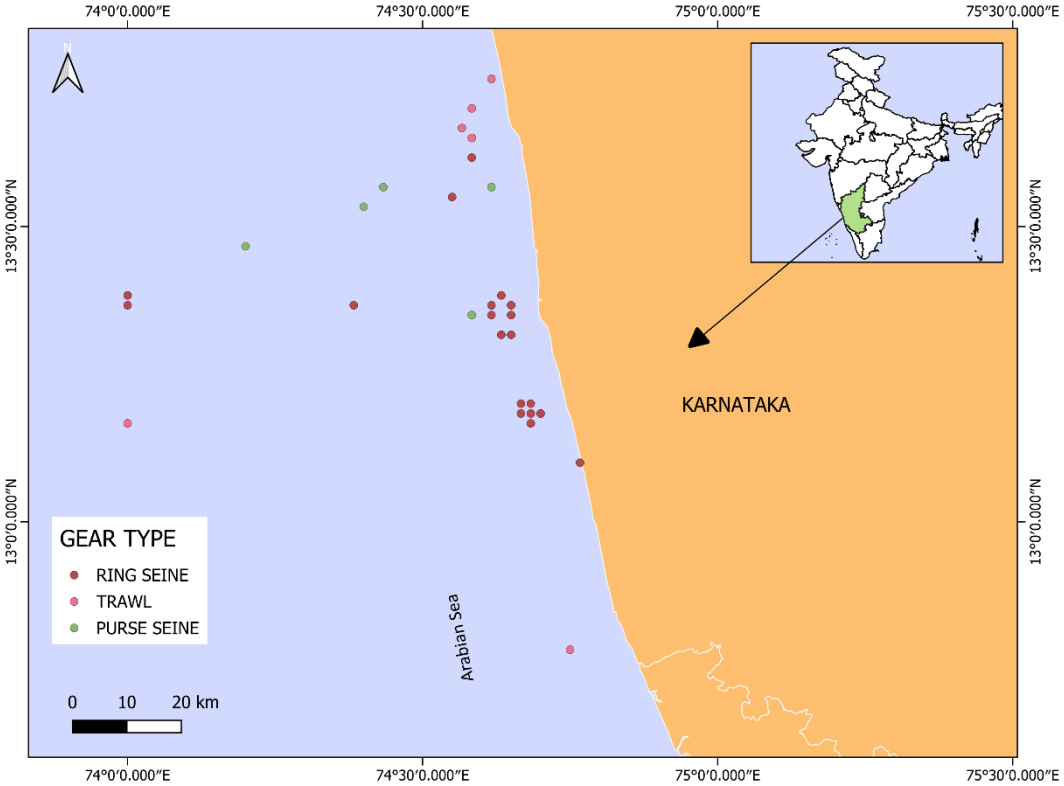
Operational depth and mesh size of Purse seines

Month	Depth (m)	Mesh size of net (mm)
January	14-38	24 &26
February	24-32	24
March	22-32	24
April	20-32	24

Operational area (Geo-position and depth) and mesh size of ring seines

Month	Depth (m)	Mesh size of net (mm)
January	15-28	24, 26 & 32
February	18-20	38
March	15-24	24 & 32
April	16-20	38
June	8-24	24 & 38

Details of Operational area (Geo-position and depth) and mesh size of trawl



Month	Shooting	Hauling	Mesh size of net (mm)
	Depth (m)	Depth (m)	
January	30-42	32-46	26
February	22-32	26-36	26

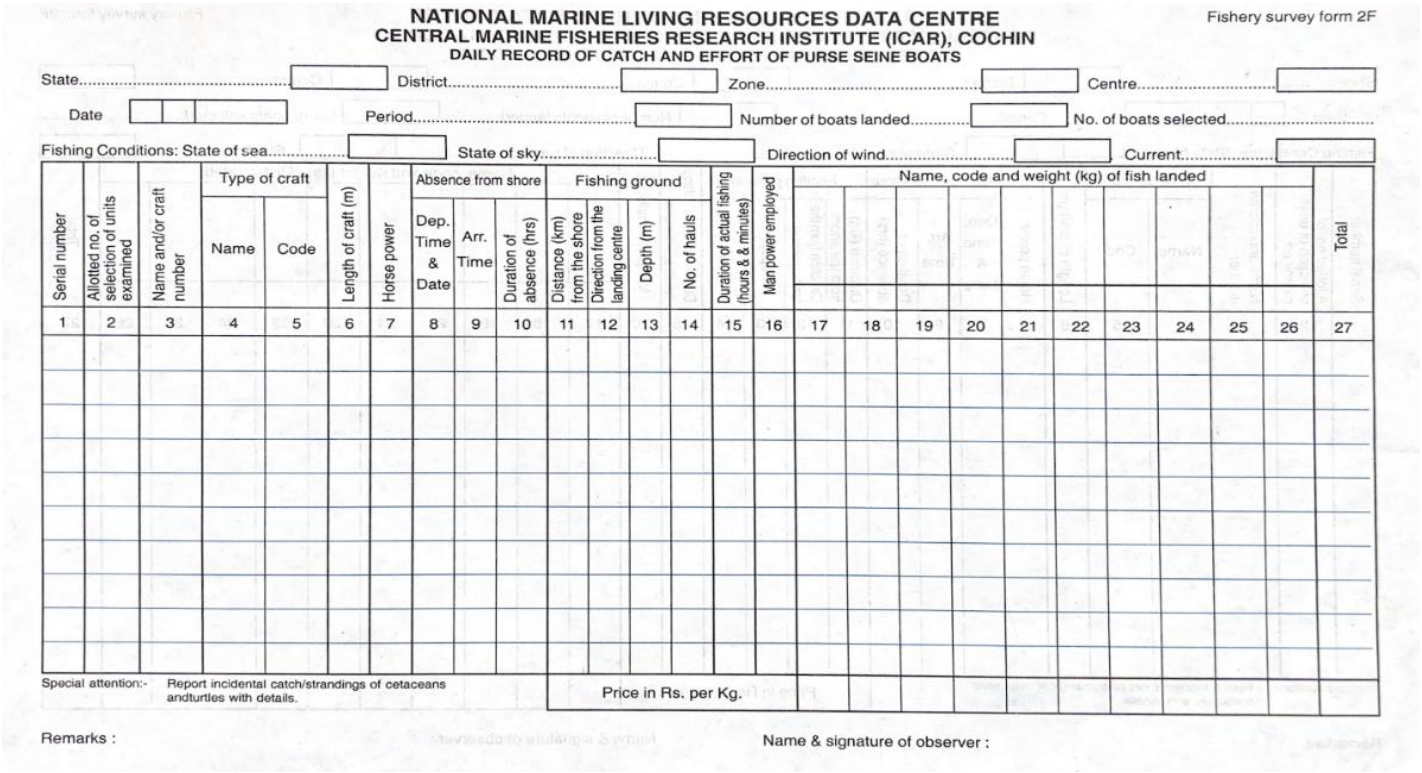
March	34-36	36-38	26
April	32-38	38-42	26
May	28-32	32-36	24-26

Resource mapping off Karnataka coast and sediment texture
Related Papers

https://eprints.cmfri.org.in/14155/
https://eprints.cmfri.org.in/15229/
https://eprints.cmfri.org.in/13667/
https://eprints.cmfri.org.in/12333/
https://eprints.cmfri.org.in/15076/

Data sheets for the collection of data

The details are collected in the format below. However, the collection is now using GPs-enabled tabs. The format is the same, and once logged in, geolocation will be captured.



NATIONAL MARINE LIVING RESOURCES DATA CENTRE
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE (ICAR), COCHIN
DAILY RECORD OF CATCH AND EFFORT OF PURSE SEINE BOATS

Fishery survey form 2F

State..... District..... Zone..... Centre.....

Date Period..... Number of boats landed..... No. of boats selected.....

Fishing Conditions: State of sea..... State of sky..... Direction of wind..... Current.....

Serial number	Allotted no. of selection of units examined	Name and/or craft number	Type of craft: Name	Type of craft: Code	Length of craft (m)	Horse power	Absence from shore: Dep. Time & Date	Absence from shore: Arr. Time	Absence from shore: Duration of absence (hrs)	Fishing ground: Distance (km) from the shore	Fishing ground: Direction from the landing centre	Fishing ground: Depth (m)	Fishing ground: No. of hauls	Duration of actual fishing (hours & & minutes)	Man power employed	Name, code and weight (kg) of fish landed										Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Special attention:- Report incidental catch/strandings of cetaceans andturtles with details. Price in Rs. per Kg.

Remarks : Name & signature of observer :

NATIONAL MARINE LIVING RESOURCES DATA CENTRE
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, (ICAR), COCHIN - 18.
DAILY RECORD OF CATCH AND EFFORT OF SMALL MECHANISED FISHING CRAFTS

Fishery survey form II
Trawler (A)

State..... District..... Zone..... Centre.....

Date Period..... Number of units landed..... No. of units selected.....

State of sea..... State of sky..... Direction of wind..... Current.....

Serial number	Serial No. of the unit Selected	Name, code and weight (kg) of fish landed																				
1	2	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
1																							
2																							
3																							
4																							
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7																							
8																							
9																							
10																							
Price in Rs. per kg																							

Name and signature