Marine Fish Landings in India 2013

Central Marine Fisheries Research Institute
Indian Council of Agricultural Research
Ernakulam North P.O., P.B. No. 1603, Cochin – 682 018
Kerala, India

Marine Fish Landings in India 2013

Marine Fish Landings in India - 2013

Central Marine Fisheries Research Institute (CMFRI) which is a research and educational institute under Indian Council of Agricultural Research (ICAR), Ministry of Agriculture (MoA), Government of India. The institute had been spearheading spotting, studying and generating research results for problems and issues that keep cropping up in the Indian marine capture fisheries sector since independence. As a backbone activity for these pursuits, CMFRI has been devising, planning and conducting surveys through the coastal belt of the peninsular region of the country (except Andaman and Nicobar Islands (AN) and Lakshadweep Islands (LAK), which leads to scientific estimates of the fishery resources brought to the shore by our fisherfolk. As it is quite obvious, being a cessationless activity, sampling strategy has to be on a continuous mode and the estimates have to be periodic (for eg. monthly/ quarterly etc.) and a special statistical approach is needed for accomplishing this. Unlike other resources like crops and cattle, the marine resources appearing in the catch netterd by fishermen can never be pre-judged even at the type of fish level. Hence an unique sampling plan was developed by the researchers of CMFRI to cover all these special circumstances and has since been robustly finalised in the sixties. The methodology so unique in having specially trained unbiased observers to estimate the landed marine fishery resources has been acknowledged by FAO and has a strong backing of a team of Fishery Resource Management (FRM) experts, who contribute to the modification of the estimation procedure on an "as and when basis".

CMFRI's fishery resource landings estimates have been a cornerstone for many research and planning initiatives putforth in India and other countries. These unbiased estimates which are obtained by analysing samples obtained from various homogeneous clusters (strata) of all the maritime provinces of the country have been collected at the "daily-boat-fish type" level on each selected landing centre (LC) on a given day. This practically means that the process yields estimates to that "landing centre – day" level for each type of fish and gear, which then gets aggregated over higher levels of regional and temporal scales (for eg., for a state for a month etc.).

An exploration of estimates obtained by using this methodology since 1950's shows the quantum jump realised by our fishermen in terms of reach and intensity of fishing. From around 0.5 million tonnes the total catch

reached a peak of 3.93 million tonnes in 2012. The fishing technology also improved from utilising the classic gears like boatseine and trawl to about 25 types of gears which are in vogue now. From a predominantly non-mechanised era in fifties, our fishing crafts now deploy motors with HP upto 400. From being restricted to the 12 nml near shore waters, our fisher folk have attained the skills and endurance to reach out to deeper waters far beyond the continental shelf region in search of oceanic resources which are quite lucrative.

The last five years of marine fishery in India have been upwardly mobile with a decline in 2013, the year being reported upon. This quiniquennium witnessed an increased occupation of smaller pelagic resources like oil sardines in top slots. This period witnessed steady increase in the operation of mechanised crafts like trawlers, which accounted for more than 95% of total catch in most of the states. This period also witnessed dip in traditional non-motorised fishery and their conversion onto partial mechanisation in the form of outboard engine propulsion. The advent of multi-day stints in crafts other than trawlers was also noted during this period. Even crafts with outboard engines started venturing out on multi-day fishing.
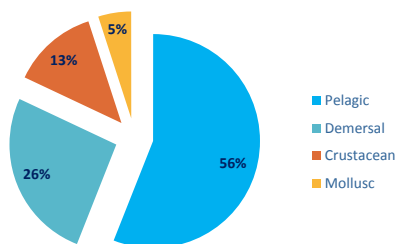
This year (2013) CMFRI had sampled a total of 7860 fishing days* across 1511 landing centres of the peninsular coast, which has yielded the sampling of 71920 crafts which have landed at various centres. The sampling coverage of these landing centres, which are weighted by their intensity of operation, has been varying from state to state. The statewise coverage showed that sampling upto 15.37% of the landing centre days has been accomplished. The coverage of such an extensive frame of landing centre days has been upward of the accepted limit of national level exercises. In states like Karnataka, where intensive fishing operations are witnessed in limited number of major centres, the coverage was at the maximum. This coverage percentage has to be viewed in the backdrop of the fact that centres visited on two different days make up two separate units. Under this constraint the coverage has been quite good in most of the states.

The 2013 marine fish landings for the country (except AN and LAK) has been estimated as 3.78 million tonnes which has witnessed a dip of 4%.

The landings witnessed in our country had always been marked for its diversity in terms of types of fish caught. The richness in the resources

* Not including the days of no fishing

is effectively reflected in the annual catch basket of the nation. Pelagic resources, which are fish types living predominantly in the upper layer of the ocean and into which most common fishes such as oil sardine, mackerel and tuna fall, have been dominating the landings as in previous years with 56%. The fin fish species which are primarily dwelling in the deeper parts of the ocean, termed as demersal resources, have contributed to over 26% of 2013 landings followed by crustacea, which include the most sought after resources like prawns

Components of marine fish landings in India - 2013

and lobsters at 13%. The molluscs, encompassing resources such as clams, oysters and cephalopods like squids, contribute to about 5% to finish the scenario. The landing records of 2013 indicated the capture of 695 types of resources which have been identified at genus/species level.

Major Resources - 2013

- Oil sardine
- Ribbonfishes
- Non-penaeid prawns
- Indian mackerel
- Penaeid prawns
- Cephalopods
- Threadfin breams
- Croakers
- Other sardines
- Scads
- Bombayduck
- Silverbellies

The resources which have contributed largely to the overall catch and comparison with the 2012 summary results is depicted in the adjacent infographic. As it can be observed resources like oil sardine, elasmobranchs and croakers have witnessed fall of varying degrees.

Oil sardine
Perches
Penaeid prawns
Croakers
Silver bellies
Flat fishes
Elasmobranchs

Resources like mackerel and rib-bonfish have witnessed a hike in their landings. Non-penaeid prawn and Bombayduck, which are distributed along the North Western coast, have witnessed a significant increase in their avail-ability.

Mackerels
Ribbonfishes Carangids
Non-penaeid prawns
Other sardines
Bombay duck
Anchovies
Tunnies

A table elaborating the landings of the four categories (assemblages) of fishes for the year 2013 is given below.

Estimated Marine fish landings (t) in India during 2013

Pelagic finfish		Demersal finfish	
Group	2013	Group	2013
CLUPEOIDS		ELASMOBRANCHS	
Wolf herring	20994	Sharks	21138
Oil sardine	595392	Skates	2347
Other sardines	159580	Rays	22986
Hilsa shad	41448	EELS	10145
Other shads	14641	CATFISHES	89141
Coilia	30767	LIZARD FISHES	56121
Setipinna	8507	PERCHES	
Stolephorus	69481	Rock cods	44487
Thryssa	42351	Snappers	6634
Other clupeids	71424	Pig-face breams	10724
BOMBAYDUCK	124509	Threadfin breams	182541
HALF BEAKS & FULL BEAKS	4305	Other perches	65568
FLYING FISHES	2149	GOATFISHES	25142
RIBBON FISHES	252179	THREADFINS	12375
CARANGIDS		CROAKERS	177395
Horse Mackerel	36313	SILVERBELLIES	121117
Scads	127935	WHITEFISH	7269
Leather-jackets	14488	POMFRETS	
Other carangids	69600	Black pomfret	18449
MACKERELS		Silver pomfret	30416
Indian mackerel	199880	Chinese pomfret	4794
Other mackerels	338	FLAT FISHES	
SEER FISHES		Halibut	1492
Scomberomorus commerson	27680	Flounders	298
Scomberomorus guttatus	14008	Soles	45055
Acanthocybium spp.	37	Shellfish	
TUNNIES		Crustaceans	
Euthynnus affinis	39738	Penaeid prawns	196942
Auxis spp.	7724	Non-penaeid prawns	213474
Katsuwonus pelamis	7078	Lobsters	1410
Thunnus tonggol	12643	Crabs	44586
Other tunnies	18108	Stomatopods	20650
BILL FISHES	9646	Molluscs*	
BARRACUDAS	25269	Cephalopods	
MULLETS	10856	Squids	100014
UNICORN COD	892	Cuttlefish	82964
		Octopus	6448
		Miscellaneous	99786
		Total	3781868

* In addition 113858 t of bivalves
(Oysters, Mussels, Clams)

The state-wise break up of the landings indicates that Guajarat, Kerala and Tamil Nadu dominate the landings spectrum with Gujarat nudging ahead of Kerala to the top slot as compared to 2012. Five states including Kerala witnessed decreased landings whereas six states/UTs saw enhanced landings.
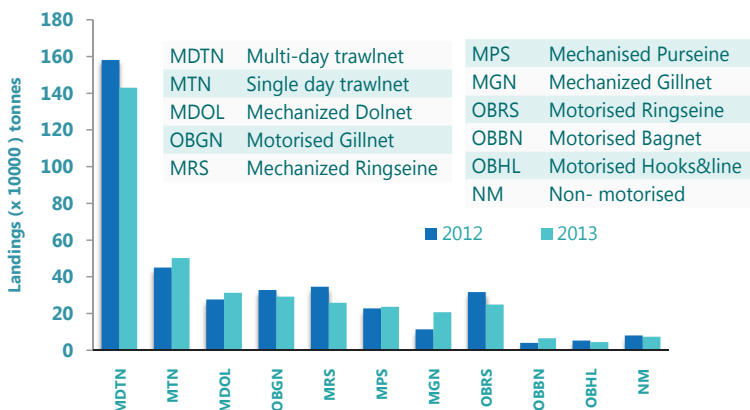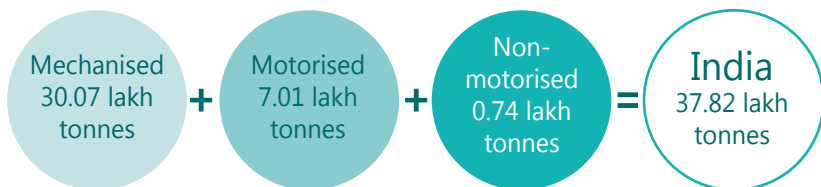
Marine fish landings in India (in lakhs) - 2013
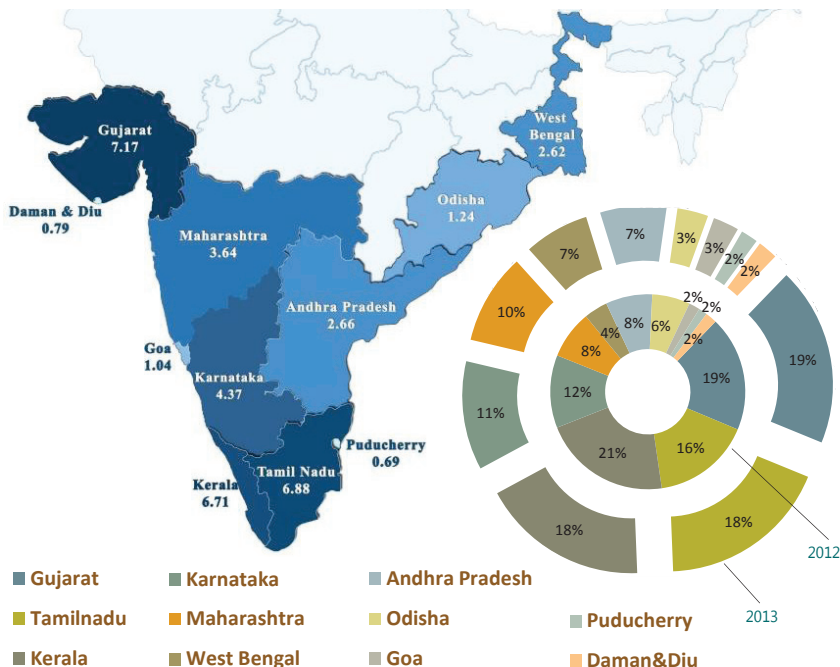
Major upheavals in terms of percentage contribution to national total have been witnessed in Kerala and Tamil Nadu to the tune of around 2-3%, with the former's contribution getting reduced and the latter's increased.

A seasonal study of the landings revealed that the fourth quarter of 2013 (Oct- Dec) has been the most productive and the second quarter was least for obvious reasons like cessation due to fishing regulations. It can also be noticed that the first and fourth quarters contributed to around 65%.
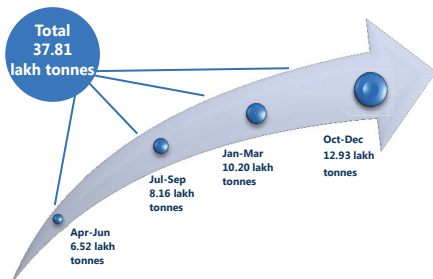
An insight into the figures revealed that among various types of gears and combinations thereof which were deployed by fisherfolk, the relative dominance of trawlnets, gillnets and seines in terms of fish landed is shown below. Subtle shifting of type of operation like single day from multi-day is visible in comparison with the previous year.

Mechanised 30.07 lakh tonnes **+** Motorised 7.01 lakh tonnes **+** Non-motorised 0.74 lakh tonnes **=** India 37.82 lakh tonnes

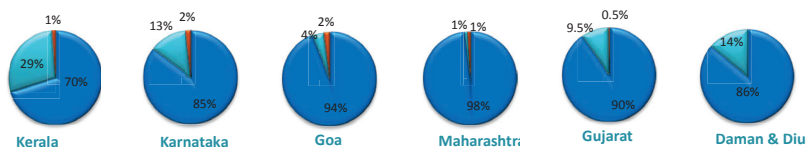|			
MDTN	Multi-day trawlnet	MPS	Mechanised Purseine
MTN	Single day trawlnet	MGN	Mechanized Gillnet
MDOL	Mechanized Dolnet	OBRS	Motorised Ringseine
OBGN	Motorised Gillnet	OBBN	Motorised Bagnet
MRS	Mechanized Ringseine	OBHL	Motorised Hooks&line
		NM	Non- motorised

A juxtaposition of the contribution by major gears in the landings of maritime provinces reveals a picture of dominance by trawlnet in majority of states, with some states such as Kerala and West Bengal receiving near equal contribution from more than one gear. Kerala also reveals prominence of outboard gears of various types as compared to other states.

Andhra Pradesh has recorded maximum contribution towards landings by non-motorized gears. The east coast has revealed more contribution through non-motorized crafts as compared to west coast.
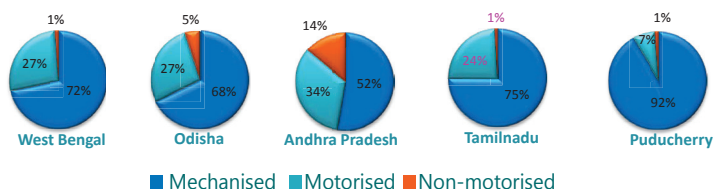
Major Gears in States – 2013

State					
West Bengal	MGN	MDTN	OBBN	MBN	OBGN
Orissa	MDTN	OBGN	NM	OBRS	OBHL
Andhra Pradesh	MDTN	OBGN	NM	OBRS	OBHL
Tamilnadu	MTN	OBGN	MDTN	MRS	OBRS
Pondicherry	MDTN		OBRS	MTN	MGN
Kerala	MRS	MDTN	OBRS	OBGN	MTN	OBBS
Karnataka	MDTN	MPS	OBRS	OBGN	NM
Goa	MPS		MDTN	MTN	NM
Maharashtra	MDOL	MDTN	MPS	MTN	MGN
Gujarat	MDTN	MDOL	OBGN	MGN
Daman&Diu	MDTN	MGN	OBGN	MDOL

The following infographic shows the extent and orientation of domination of mechanized crafts. The machine propelled crafts of west coast have

Kerala — 1%, 29%, 70%
Karnataka — 13%, 2%, 85%
Goa — 2%, 4%, 94%
Maharashtra — 1%, 1%, 98%
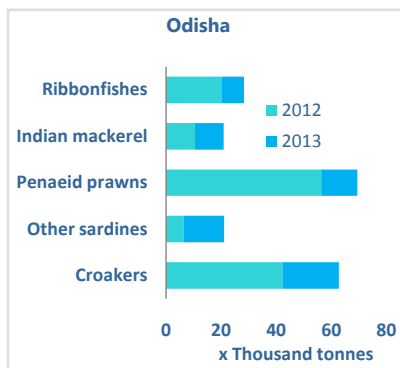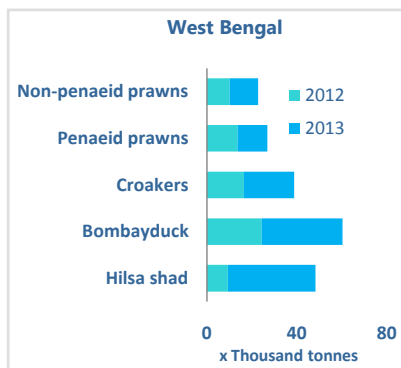**Gujarat** — 9.5%, 0.5%, 90%
Daman & Diu — 14%, 86%

yielded combined average of 98% of the total landings. In case of the east coast the contribution by mechanized vessels is around 70%.

West Bengal — 1%, 27%, 72%
Odisha — 5%, 27%, 68%
Andhra Pradesh — 14%, 34%, 52%
Tamilnadu — 1%, 24%, 75%
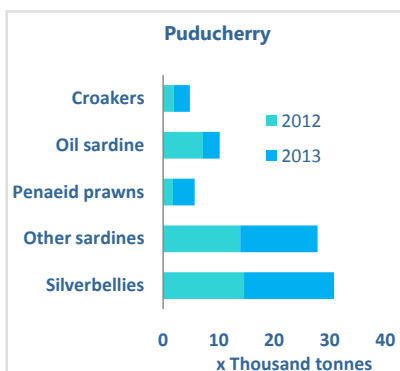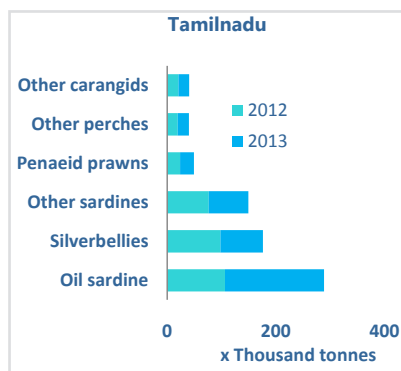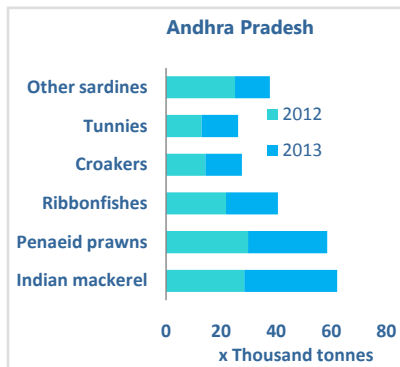**Puducherry** — 1%, 7%, 92%

■ Mechanised ■ Motorised ■ Non-motorised

Statewise marine fishery resources in 2013 compared with the previous year throws up a myriad of scenarios. In West Bengal Bombayduck, hilsa shad, croakers, penaeid and non-penaeid prawns have shown improved landings in comparison to 2012. In Odisha, penaeid prawns, croakers and ribbon fishes have shown a reduction in their landings, whereas Indian mackerel landings were similar to 2012.

West Bengal

Non-penaeid prawns
Penaeid prawns
Croakers
Bombayduck
Hilsa shad

■ 2012
■ 2013

0   40   80
x Thousand tonnes

Odisha

Ribbonfishes
Indian mackerel
Penaeid prawns
Other sardines
Croakers

■ 2012
■ 2013

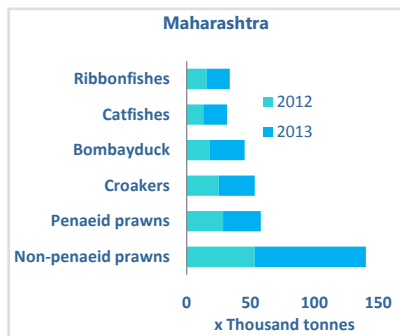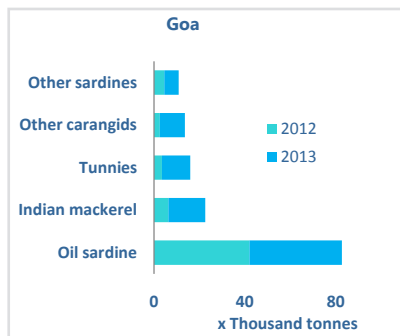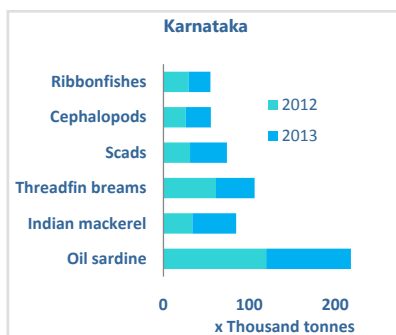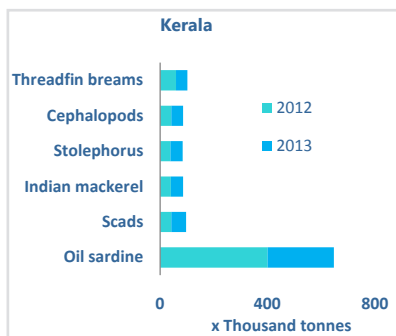0 20 40 60 80
x Thousand tonnes

Penaeid prawn, Indian mackerel, ribbon fishes, croakers and Tunnies were the major species landed in Andhra Pradesh and their quantum were relatively same as compared to 2012. Tamil Nadu saw the oil sardine emerging as a major species and the relegation of once dominant silver bellies to lower rungs. Puducherry catch spectrum was dominated by silver bellies and

Andhra Pradesh

Other sardines
Tunnies
Croakers
Ribbonfishes
Penaeid prawns
Indian mackerel

■ 2012
■ 2013

0 20 40 60 80
x Thousand tonnes

Tamilnadu

Other carangids
Other perches
Penaeid prawns
Other sardines
Silverbellies
Oil sardine

■ 2012
■ 2013

0   200   400
x Thousand tonnes

Puducherry

Croakers
Oil sardine
Penaeid prawns
Other sardines
Silverbellies

■ 2012
■ 2013

0 10 20 30 40
x Thousand tonnes

other sardines and their landings were similer in both the years. Penaeid prawns and croakers have shown spurt in landings in 2013 as compared to 2012.

Kerala witnessed a fall of its major resource viz. oil sardine this year. Other major contributors to Kerala basket were Threadfin breams, cephalopods, stolephorus, Indian mackerel and scads.

In Karnataka, oil sardine which is the major contributor has witnessed a dip in 2013 as compared to the previous year. Indian mackerel and scads have recorded marginal increase in landing as compared to 2012. The other major contributors such as ribbon fishes and cephalopods are stable in their quantum of landings, whereas threadfin breams have shown a dip after a record landing in 2012.

Kerala

x Thousand tonnes

Karnataka

x Thousand tonnes

Goa

x Thousand tonnes

Maharashtra

x Thousand tonnes

Goa, being a purse seiner dominant state, has been flooded with pelagic catch as expected. Oil sardine is the major contributor to the landings and has not deviated much from 2012 performance. Other resources such as carangids, Indian mackerels, other sardines and tunnies have shown substantial increase over their previous year's performance.

Maharashtra's spectacle has been dominated by the resurgence story of non-penaeid prawn. Other traditional resources such as Bombayduck, catfishes and ribbon fishes have shown increased landings in comparison to 2012.

Gujarat which has shown a slight dip in total landings, has accounted for high contributions from rib-bonfishes, non- penaeid prawns, threadfin breams, which have also recorded increased landings. The fishery of Bombayduck witnessed a slightly lesser production and the lucrative croaker fishery also had slipped a bit.
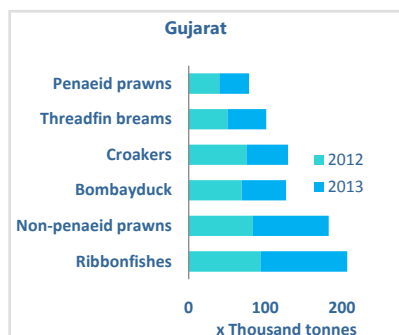
An intergrated study of the various gears in operation and the primary resources netted by them and the catch rate measure of their efficiency is depicted below. As it can be visualised multi day boats account for more quantity of catch per trip. The pelagic gears like purse seine and ring seine have recorded maximum per unit catch. However out board gillnet crafts have recorded very low catch rate.

Major gear efforts and catch rates - 2013

width of columns indicate relative catch rates
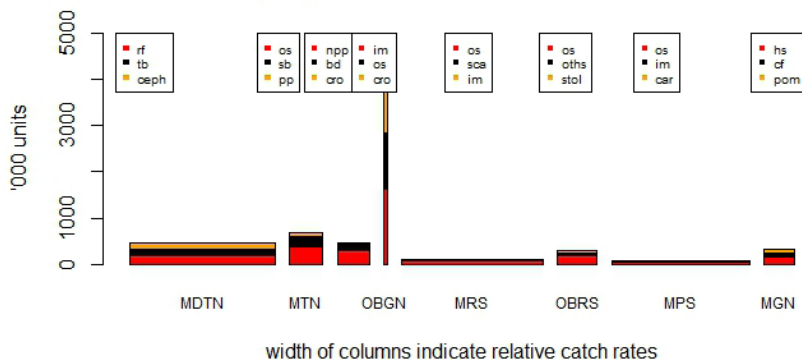
rf	Ribbonfish	sca	Scads
tb	Threadfin breams	im	Indian mackeral
ceph	Cephalopods	stol	Stolephorus
os	Oil sardine	car	Carangids
sb	Silver bellies	hs	Hilsa shad
pp	Penaeid prawns	cf	Catfish
npp	Non Penaeid prawns	pom	Pomfret
bd	Bombay duck	oths	Other sardine
cro	Croakers		

Looking back, it can be inferred that a dip to the tune of 4% in 2013 landings in comparison to the previous year's figures can be attributed mainly to the fall in the most caught resource, Oil Sardine. The fall could be attributed to many reasons such as occurrence of more inclement rough sea days resulting in reduced venturing of crafts. This fall has also affected the landings of Kerala, which has been a major contributor to the national landings. Considering the fact that 2012 was an all time high landings year and cyclicities around the long term trends are common in such production series, this reduction may not be worrisome. However, the recent trend of aimless targeting of small sized/ juvenile fish to cater to the fish meal sector is a point to bother about in years to come. Another issue to be focused upon is the increased deployment of high speed, high efficient engine which has increased the reach to unexplored areas but resulted in reduction in Catch Per Unit Effort (CPUE).
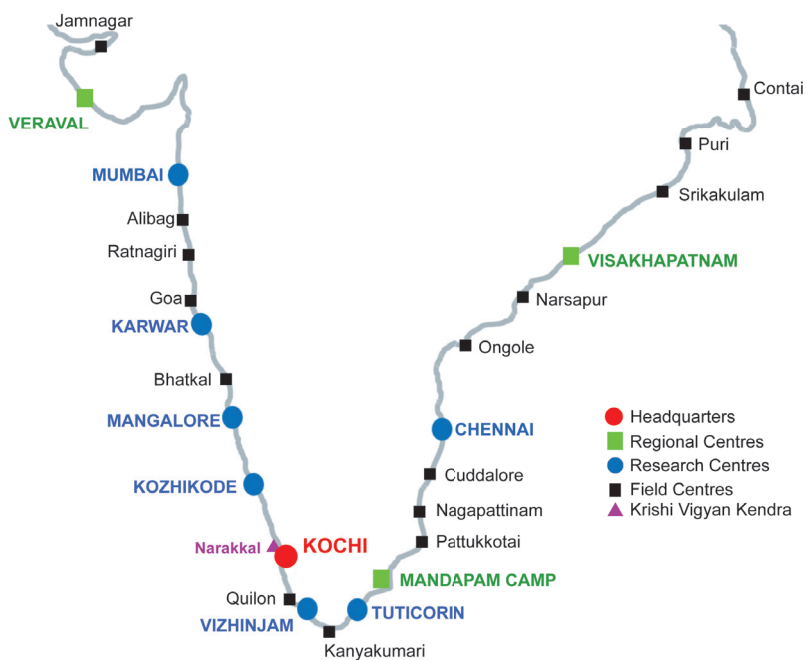
Sampling Methodology adopted by CMFRI

The landings along the Indian coast is a continuos phenom-enon and hence CMFRI has developed a procedure to collect information from landing centres (LC) and also boats that land fish, which are selected in such a way that such information would help arriving at total landings for a month in an area known as zone, without bias. Such a procedure is statistically referred to as multi-stage stratified random sampling. Under this design, every zone is divided into groups of LCs, which are located in it and which are quite similar in their number and type of crafts in operation. These groups, called strata, are the first level of selection wherein suitable number of LCs are picked up to be visited by specially trained field personnel of the institute and are listed to be covered on dates spread evenly across the given month. On the day(s) allotted the field staff record the catch offloaded by boats bearing different gears (nets) arriving at LC, which again are selected at random, in case more such boats arrive during observation. In all the enumerator records data pertaining to the fish types landed along with quantity and time spent in fishing them for a 24 hours period, which is then dispatched to headquarters on regular basis. At the headquarters, the data gets validated and scrubbed clean of inadmissibility before getting digitised. Cus-tom made software collate the data at the LC-date level and arrive at mean landings in Kg. for the resources recorded using the gears observed. The per boat average then gets raised to the LC-date level and they in turn get averaged out over all the LC-days visited in a zone for a given month. Those aver-ages are then up-scaled to the month under observation using the number of fishing days. Such figures get summarised at higher levels like state, season and year by the summing up of relevant estimates. This procedure originally set in motion in the sixties, has been constantly undergoing improvement and modification to suit to newer developments in the fishery.

Schematic Depiction

Indian Coastline → Maritime States → Zones → Strata → Landing centres → Gears → Boats → Fish Species

Year → Month → Ten days strip → Day/Date

Complete Enumeration

Sampling
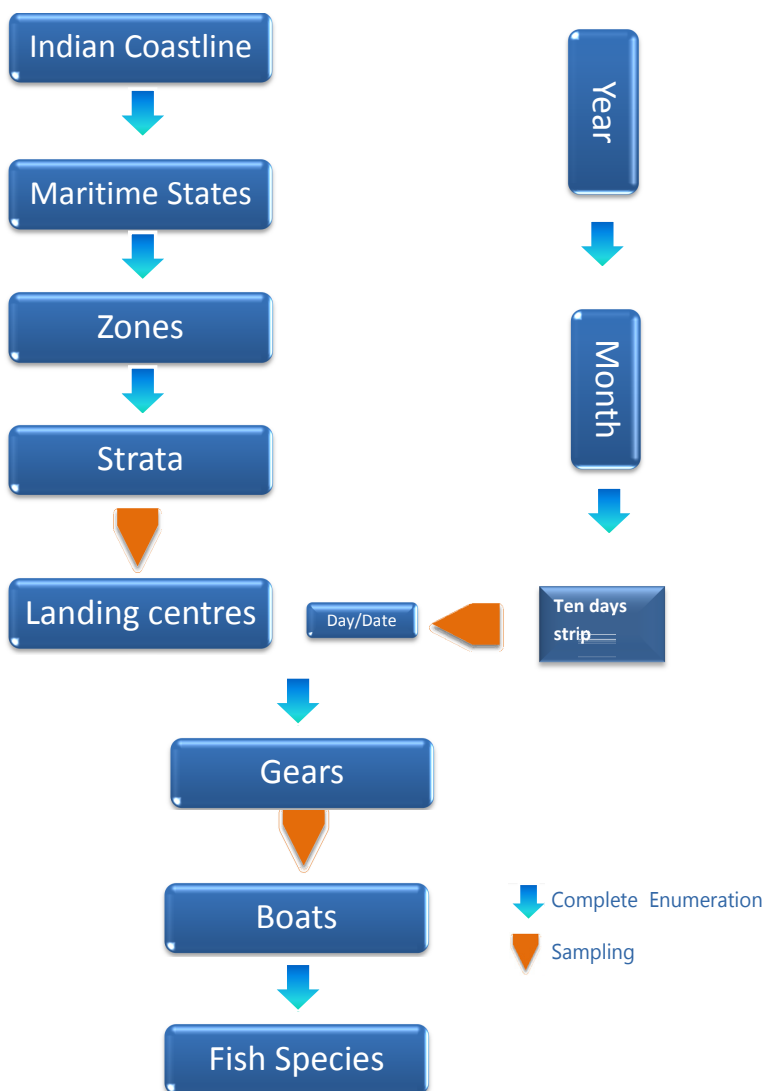
Data Collection Network of CMFRI

Jamnagar

Contai

VERAVAL

Puri

MUMBAI

Srikakulam

Alibag

Ratnagiri

VISAKHAPATNAM

Goa

Narsapur

KARWAR

Ongole

Bhatkal

MANGALORE

CHENNAI

KOZHIKODE

Cuddalore

Nagapattinam

Narakkal ▲ **KOCHI**

Pattukkotai

Quilon

MANDAPAM CAMP

VIZHINJAM **TUTICORIN**

Kanyakumari

🔴 Headquarters
🟩 Regional Centres
🔵 Research Centres
■ Field Centres
▲ Krishi Vigyan Kendra

केंद्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान

Central Marine Fisheries Research Institute