

Research Communications

Adoption of ingenious fishing method to augment fish catch in coastal karnataka

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Abstract

Gillnets are one of the important gears contributing to the marine fish landings of Karnataka. A variety of gillnets (drift, bottom set, encircling and entangling), are deployed in the fishery. The smaller monofilament gears are operated by small non-motorized and motorized crafts. The larger polyamide high-density polyethylene nets are operated from large mechanized crafts. The use of large meshed knotted monofilament gillnets deployed from mechanized trawlers is a novel introduction and has enabled fishers to operate over submerged banks, rocky patches and reefs. Use of these nets have resulted in good catch that included several commercially valuable species of elasmobranchs, snappers, groupers, surgeonfishes, lobsters and also less valuable perchlets, bandfish, blowfish, porcupine fish, sack fish, gurnards and stargazers resulting in better income for the fishers in the region.

Keyword: *Knotted monofilament gillnet, Karnataka, submerged banks, discards*

Introduction

Karnataka is one among the top five coastal states in marine fish production of the country with around 5 lakh tons landed annually on an average during the past five years. However, the marine fishing activities and marine fish landings in coastal Karnataka has been on a decline with poor catch of commercially important fishes since 2020. The reasons for these subdued activities in the marine fishing sector and fish production are several, including loss of fishing days as a result of the lockdown declared in the wake of the COVID19 pandemic, inclement weather conditions, shortage of migrant labour force employed as crew, steep hike in fuel price, disruptions in domestic and export marketing links, etc. In the wake of these limitations, the fishers in coastal Karnataka have now started using a knotted monofilament net suitably modified to operate over reefs, submerged rocky patches and sea mounts and effectively exploit commercially valuable fishes. The net deployed, is an improved version of the basic monofilament gillnet used

mostly for exploiting small and medium sized pelagic fishes (sardines, mackerel, white sardine, engraulids, other clupeids), some demersal fishes (sciaenids, ladyfish) and crustaceans (prawns and crabs). However, the new monofilament gillnet used is knotted and with thicker diameter (1.8 mm). Unlike the knotless finer monofilament gillnet commonly used, this net is modified in such a way that it just hovers almost like a blanket close to the bottom/ rocky patches/ seamount area, depending on the area of deployment. In addition to the thicker diameter, the weights and limited floats rigged to the net ensures that the gear does not drift far away from the point of deployment and neither does it stand up vertically like a meshed panel wall in the water column. The gear therefore behaves more like an entangling bottom set gillnet (traditional *negarbale / jeppubale*) than a drift gillnet, entangling the fishes/shellfishes/and other resources residing close to bottom/ rocky patches/ seamount area. The report provides firsthand information on the details of the gear, mode of operation, resources landed, utilization, marketing and concerns on the

probable impact on large scale operation of this type of targeted fishing on the fishery of the region.

Fishery

The monofilament (1.8 mm diameter) knotted mesh panel has 200 mm mesh size (knot to knot). The standard size of the gear panel has a width of 20 m and length of 3000 m or more. The total length of the gear varies from 3-4 km depending on the area of operation. Such knotted panels are readily available in the market and fishers procure it as per their requirement. The monofilament does not absorb water when soaked and therefore will continue to be light and maintain its original weight. Lead weights of 200 g are attached to the foot rope (12 mm diameter nylon rope) of the panel at an interval of 1 m. Small cork floats are attached to the head rope (10 mm diameter nylon rope) of the panel at an interval of every 10 m. This enables the net to sink to a desired



Fig.1 The knotted monofilament net used by fishers of coastal Karnataka

depth and also allows it to spread loosely in the area (@ 2-3 nmi) of operation (Fig.1). This gear is deployed from the large multi-night trawlers which is fitted with a small hydraulic stainless steel power block (Fig.2) that assists in hauling of the net. The fishing voyage generally extends to 10-12 days with one haul made during nights of halt. There are 10-11 crew members for fishing operations. As this is new technique being adopted in Karnataka, skilled fishers from Tuticorin, familiar with handling and operating this type of fishing gear are engaged.

There are a number of submerged rocky patches, knolls, reefs and seamounts off Karnataka Coast between 12° N-14° N and 71° E -72° E and the largest of these seamounts, 'Manchappara (Bassas de Pedro Bank)' is located around 120 nmi off Mangalore and extends from Kasargode in the south to the Coondapur in the north (Fig.3). This is one among the 5 submerged banks which comes under the Union Territory of Lakshadweep. The knotted monofilament



Fig.2. Hydraulic power block fitted to a trawler for operating the knotted monofilament gear

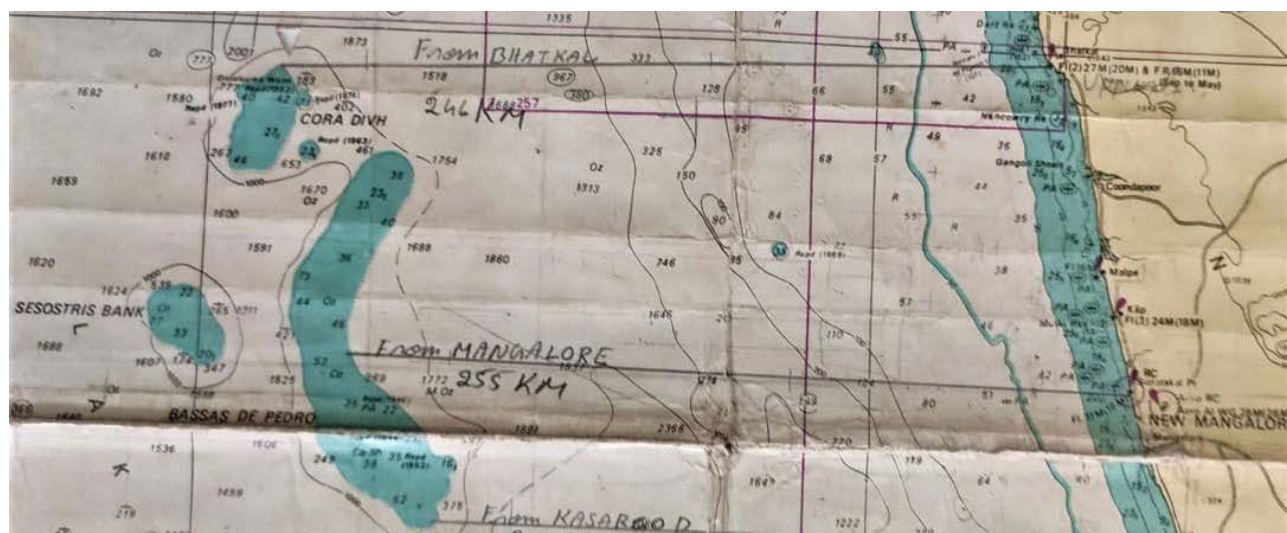


Fig.3. Location of fishing grounds off Mangalore

gear is operated in this region, over the seamount and submerged rocks, at depths ranging from 50 to 70 m.

The craft sets out for fishing during the morning hours around 3 AM and around 15 hours is required to reach the fishing ground which is about 120 nmi from the shore, when cruising at a speed of 8-9 knots. On reaching the fishing ground, the net that is pre-adjusted to hover at a depth of 50 -70 m is slowly released into the water over the identified part of seamount or submerged rocks with the craft moving at a slow speed of 2 knots. After the net is deployed, the craft is anchored nearby till the time of next operation the following evening. The time taken to shoot the net is around an hour and a half. The net is left soaking for about 8 hours and hauled with the help of the power block fitted in the boat. The hauling and untangling the net process takes around 2-3 hours depending on the size of the net and quantity of catch. Bigger sized fishes were lifted onboard using a gaff hook.

The net, which settles close to the seamount/rocks as a loose sheet of meshed panel, actually entangles the fish and other species that reside and move around the reefs/ seamounts/rocky patches. When hauled up with help of the power block, the meshed panel comes up like a rope with fishes and other organisms entangled within (Fig.4). Therefore, removal of the entangled organisms and spreading of the net panel takes several hours. The



Fig.4. Monofilament gear appears as a thick rope when hauled up using the power block

vessel after a voyage of 7-10 days, returns back to base cruising for 14-15 hours.

The catch comprised of an array of elasmobranchs, bony fishes, shellfishes and several other reef/ rock associated fauna and flora. Each voyage yielded on an average 6 t with around 200-300 kg being discarded. The catch depending on their market value are either stored in ice in the inbuilt fish hold of the craft or discarded into the sea (Table 1). Details of discarded items were collected through enquiry and some photographs provided by the crew. Discards mainly comprised groups such as octopus, starfishes, gastropods (mainly Horned Helmet, *Cassia cornuta*), seafans, seaweeds, gorgonids, sponges and corals)

Table 1: Catch recorded in the monofilament gear

Commercially important Flora/Fauna landed

Sl. No.	Groups/ Genus /speceis	Common name
I	Rays	
i	<i>Taeniurops meyni</i>	Round ribbontail ray
ii	<i>Dasyastis</i> spp.	Stingray
iii	<i>Himantura fai</i>	Pink whipray
iv	<i>Neotrygon</i> spp.	Spotted maskray
v	<i>Urogymnus asperrimus</i>	Porcupine whipray
vi	<i>Mobula</i> sp.	Devil ray
II	Guitarfishes	
i	<i>Rhynchobatus</i> spp.	Guitarfish
ii	<i>Rhinobatos obtusus</i>	Widenose guitarfish
iii	<i>Rhina ancylostoma</i>	Bowmouth guitarfish
III	Sharks	
i	<i>Rhizoprionodon acutus</i>	Milk shark
ii	<i>Chyllioscyllium</i> spp.	Bamboo shark
iii	<i>Nebrius</i> spp.	Nurse shark
iv	<i>Galeocerdo cuvier</i>	Tiger shark
v	<i>Stegostoma fasciatum</i>	Zebra shark
IV	Snappers	
i	<i>Lutjanus lutjanus</i>	Bigeye snapper
ii	<i>Lutjanus russellii</i>	Russell's snapper
iii	<i>Lutjanus madras</i>	Indian snapper
V	Rock cods/Groupers	
i	<i>Epinephelus flavocaeruleus</i>	Blue-and-yellow grouper
ii	<i>Cephalopholis sonnerati</i>	Tomato hind
i	<i>Aethaloperca rogae</i>	Red mouth grouper
ii	<i>Epinephelus</i> spp.	Grouper
VI	Surgeon fish	
I	<i>Acanthurus xanthopterus</i>	Yellowfin surgeonfish
li	<i>Naso annulatus</i>	Whitemargin unicornfish

Commercially important Flora/Fauna landed

Sl. No.	Groups/ Genus /speceis	Common name
iii	<i>Naso vlamingii</i>	Bignose unicornfish
VII	Parrotfish	
ii	<i>Cetoscarus bicolor</i>	Bicolour parrotfish
iii	<i>Chlorurus</i> spp.	Parrotfish
iv	<i>Scarus</i> spp.	Parrotfish
VII	Wrasses	
i	<i>Cheilinus undulatus</i>	Humphead wrasse
IX	Perchlets	
i	<i>Chelidoperca</i> spp.	Perchlet
X	Bandfishes	
	<i>Acanthocephala indica</i>	Bandfish
XI	Triggerfish	
i	<i>Abalistes stellaris</i>	Starry triggerfish
ii	<i>Odonus niger</i>	Red-toothed triggerfish
iii	<i>Balistoides viridescens</i>	Titan triggerfish
XII	Squirellfishes/Soldierfishes	
i	<i>Sargocentron</i> spp.	Squirellfish
ii	<i>Ostichthys</i> spp.	Soldierfish
XIII	Blowfishes	
i	<i>Arothron</i> spp.	Pufferfish
XIV	Porcupine fishes	
i	<i>Diodon hystrix</i>	Spot-fin porcupinefish
ii	<i>Diodon holocanthus</i>	Long-spine porcupinefish
iii	<i>Cylichthys</i> spp.	Burrfish
XV	Stargazers	
i	<i>Uranoscopus</i> spp.	Stargazer
XVI	Gurnards	
i	<i>Satyrichthys welchi</i>	Robust Armoured Gurnard
XVII	Duckbills	
i	<i>Bembrops caudimacula</i>	Duckbills
XVIII	Snake mackerels	
i	<i>Neopinnula orientalis</i>	Sackfish
XIX	Flounders	
i	<i>Chascanopsetta lugubris</i>	Pelican flounder
XX	Lobster	
i	<i>Puerulus sewelli</i>	Arabian whip lobster,

Table 2. Details of operating cost for a single voyage

Item	Quantity	Cost (₹)
Fuel	1200 litres @ ₹ 83/litre	99,600
Ice	5 t	50,000
Salary of crew	10-11 members	50% of income generated from sale of catch
Ration	@ ₹ 1000/day	15,000
Other expenses	₹ 500/day	5,000

Economics of the new fishing method was evaluated. The existing large mechanized multi-day trawlers were modified and fitted with a small hydraulically operated power block costing ₹2 lakhs. The cost of net material (₹18000 @ ₹350 per kg) and additional lead weights (₹60,000 for 1000 numbers @ ₹20/kg), cork floats (₹2,000 @ ₹5 per cork) and labour charges for fixing them (₹9,000/-, 3 persons for 3 days labour @ ₹1000 per person per day). A uniform rate of ₹ 120 per kilogram for fishes with high commercial value and Rs. ₹24 per kilogram for fishes not preferred for direct consumption. The average income generated per trip assuming an average landing of 6 t, was estimated to be around ₹7.5 lakhs. Of the total income generated, 50% is shared by the crew and 50% is for the boat owner. The boat owner, invests for the modifications of the craft, the gear, fuel, ice, ration and other miscellaneous expenses.

The fishing using large drift gillnets and hook and line by fishers from Tamil Nadu over the seamounts located off Karnataka has been described in detail by Bineesh *et al.* (2014). This is for the first time that a few fishers from Karnataka have initiated fishing using this knotted monofilament gear. Though, the yield is observed to be good, indiscriminate fishing of reef-based resources may not be a healthy fishing practice. The damages caused to the reefs/sea mounts/submerged rocky patches during this type of fishing and anchoring are likely to have a cascading and deleterious impact on the region's ecosystem. Further, several unconventional resources, which includes protected and endangered organisms, are harvested during this type of fishing a discarded as it does not fetch any value. Therefore, though this type of fishing brings in good catch and remuneration to the fishers, it should be properly monitored and regulated, if necessary.

Reference

Bineesh, K. K. et al., 2014. *Indian J. Fish.*, 61(3): 29-34.

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