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**SHRIMP TRAWLING IN THE DEEP SEA-
STATUS AND FUTURE CHALLENGES**¹Rajool Shanis C.P., Shyam S. Salim,²Hashim Manjebrayakath and Pillai N.G.K.Central Marine Fisheries Research Institute (CMFRI),
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²Centre for Marine Living Resources and Ecology,
Kendriya Bhavan, Kochi – 682037**ABSTRACT**

The current level of fish harvest exhibits serious threat to the fish food security in the country and poses the need to explore, identify and utilize nonconventional fisheries resources. Kerala is one of the coastal states of India where the deep sea shrimp trawling operations were carried out on a large scale since a decade back. Presently the annual deep-sea shrimp landings showed an overall decreasing trend. The present study analyzed the impediments in deep sea shrimp fishery operations and revealed that the high operational cost, high risk and efforts, lack of skilled and trained manpower, low market price realisation, abundance of discards, poor quality of shrimps, low level of harvesting technology perceived a major hurdles in deep sea shrimp fishery sector. The study suggests the need for improved governmental support in deep sea operations for the sustenance of the sector in ensuring fish food security for the Kerala populace.

Key words: *Deep Sea, shrimp fishery, Status, Issues, Kerala***INTRODUCTION**

Fishery sector continues to be one of the fastest growing food sectors in the country in addition to the aquaculture. The current level of marine fish production in India is around 3.78 million tonnes ^[1]. Marine fisheries constitute an important sector in the nation not only as a major food source but also as a generator of export earnings and employment. Globally, the trend shows that the consumption of fish is on a rise and there has been an unceasing increase of issues pertaining to food security in terms of spiralling of the fish prices as well as non-availability of fish. With the decrease in catch per unit effort of fish resources there is a critical requisite to identify new fishery resources to sustain the fish food security of the country.

Shrimps occupy a significant position in the exploited marine fishery resources of India and most valuable seafood commodity in export market. Among the various maritime states, Kerala has been ranking third in total Shrimp landing having an average catch of 50514 t during the period 1985- 2007^[2]. The present production of marine shrimp in Kerala is estimated to be 36756 t which represent 89.7 percent of the total crustacean landings ^[1]. Deep-sea shrimp fishing operations in Kerala commenced in 1999 with its initial phase registered heavy landings, but dropped down considerably in the subsequent years. In this scenario the present study was carried out to analyze the status and challenges of deep-sea shrimp fishery in Kerala.

MATERIALS AND METHODS

The data on catch, effort and species composition of deep sea shrimps were collected from Sakthikulangara (Kollam), Vypine and Cochin Fisheries Harbours of Kerala State during the period 2009 to 2011. The monthly catch data was collected and analysed for arriving at the trends in deeps sea shrimp fisheries landings at the species level. In order to assess the different impediments perceived by the trawl owners and fishermen the Garrette Ranking Technique ^[3] was employed to rank the problems in deep sea shrimp fishing as expressed by the trawl owners and labourers. The order of merit given by the trawl owners was transmitted into scores. For converting the scores assigned by the trawl owners and labourers towards the particular problem, percent position was worked out using the formula.

RESULTS AND DISCUSSION

Deep-sea shrimp fishery

The landings of deep-sea shrimps were reported from about ten major as well as minor fisheries harbor along the Kerala coast during the early years of fishery and subsequently narrowed down to three harbors, namely Sakthikulangara, Vypine and Cochin Fisheries Harbour. Presently deep-sea shrimp landings at these three landing centres together accounted for almost the entire fishery in Kerala. Even though fourteen species observed in the landing, there are seven deep-sea shrimp species – *Aristeus alcocki*, *Heterocarpus gibbosus*, *H. woodmasoni*, *Metapenaeopsis andamanensis*, *Plesionika quasigrandis*, *P.martia* and *Solenocera hextii* have commercial interest due to dominate landing in the fishery. The pandalid shrimps were the main group in the fishery which represent up to 55 percent of the total landings. Among these, *Plesionika quasigrandis* is the most dominant species and accounted for 27 percent of the total annual landings.

The deep-sea shrimp fishing season in Kerala began at the end of the August and closed in the first/second week of May. The period November to

February is the major season for deep-sea shrimp fishery accounting for an average of 70 percent of the annual landings and the previous researchers also reported almost the same period for the bulk landings along the Kerala coast ^[4, 5]. In the total deep-sea shrimp landings, 68 percent contributed by Sakthikulangara fisheries harbour and earlier studies also reported the high proportion of catch from the Sakthikulangara harbour.

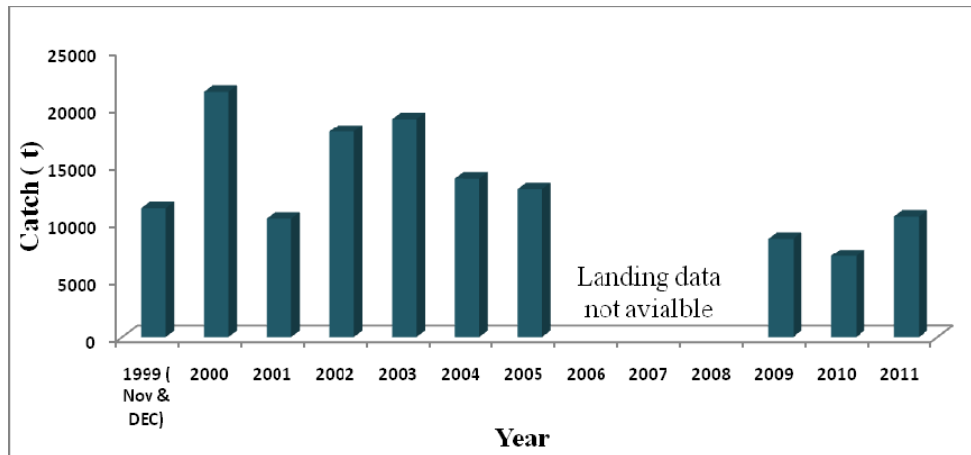


Figure 1. Deep-sea shrimp landing in Kerala during 1999-2011

The average annual landing of deep-sea shrimp in Kerala coast during the period 2009-11 was 8717 t. The annual deep-sea shrimp landing indicated an overall decreasing tendency (Fig.1). In the initial period of fishery (November 1999 – March 2000) the landing of deep-sea shrimps was estimated 23426 t ^[4]. The catch was increased to more than 45000 t during the period September 2000 to April 2001^[5]. The catch rate also showed the decreasing trend. The highest catch rate (59 kg hr⁻¹) was recorded during the initial year of the fishery ^[4]. and during the study period (2009-11) the average catch rate was observed 24.19 kg hr⁻¹.

Impediments and prospects in deep-Sea shrimp trawling operations

In order to analyse the impediments faced in the deep sea shrimp fishing operations, ninety boat owners and fishermen were interviewed using a pretested interview schedule during the period August 2010- May 2011. The important concerns opined by them, were listed, ranked and on the basis of the ranks assigned. The results indicated that the high operational cost, high risk and efforts, lack of trained and skilled persons, low market price realisation, abundance of discards, poor quality of shrimps, low level of technology were the major problems encountered in the deep sea shrimp fishing operations. The highest score of 81.43, is for the high operation cost followed by the score of 80.95 for the low

market price of deep sea shrimps and the lowest score (17.14) for low level of technology.

The high cost of operation is one of the major problem faced by the deep-sea shrimp fishery sector was ranked first among the constraints faced by deep-sea shrimp trawlers. The major operational components in trawlers are fuel charges. The fuel share constitutes about 56 percent of total operation cost in deep-sea trawlers. But in the case of multiday trawlers operating less than 200 meter depth contribution of fuel cost is 49 percent ^[6]. The cost for ice, water, provisions and maintenance charge is also higher in trawlers operating in deep-sea. Government should provide subsidies for the fuel to reduce the higher operational cost. The market rate of deep-sea shrimp is comparatively low due to low meat yield realisation. The average yield of meat of deep-sea shrimp is 36 percent where as in coastal shrimp the yield was 64 percent ^[7].

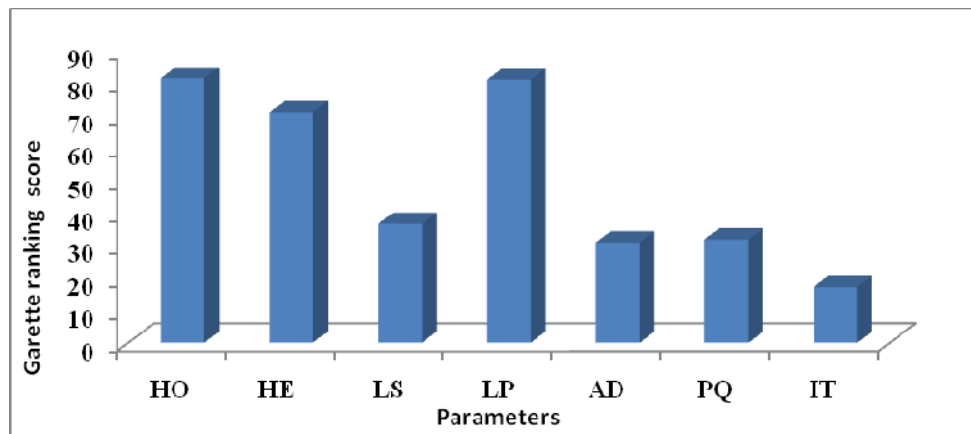


Figure 2. Analysis of the problems in deep sea fishing operations - Garrette Ranking Technique (HO, high cost of operation, HE, high risk & effort, LS, lack of skilled persons, LP, low market price realisation, AD, abundance of discards, PQ, poor quality of shrimps, IT, inadequate technology development)

One of the major quality problems in the deep-sea shrimp is its rapid discolouration due to melanosis, which is affecting the market value of deep-sea shrimp in international market ^[8]. The deep-sea fishing operations are very risky with the fishing ground is far-flung from the coast and the fishing voyage extended up to more than ten days. Climatic condition of oceanic waters is not favourable for deep -sea shrimp trawling operation day in and out. The most of the deep-sea fishing grounds were in international shipping channel and many times heavy ship traffic happened along the fishing grounds and causes the accident during the fishing operation. However there exists an increased risk and uncertainty in the deep sea fishing operation necessitating free insurance coverage for deep-sea shrimp trawlers and proper vessel traffic management system.

The deep-sea shrimp trawling operation often generate huge proportion of fish discards which ranges from 20- 40 percent and sometimes exceed more than 80 percent^[9]. Unfamiliar appearance, taste and texture of deep-sea fishes caused the less market preference of these resources. The biochemical analysis indicated that many of the deep-sea fishes with high protein content and low fat^[10,11]. The per capita protein availability is below the recommend level in India^[12] and the accurate utilization of discard fishes is necessary. So there exists a vast scope of expansion of value added products from deep-sea fishes for ensuring nutritional security. The development of accurate post harvest technology of deep-sea by catch fin fishes help to utilize these resources and it will support fishermen to earn more income. Off late, the research institutes had located many new deep-sea fishing grounds based on the deep-sea exploratory survey and state of art technology. The fishermen are unaware about these fishing grounds. However, a holistic system should be developed with government initiatives at the centre to disseminate fishing leads to fishermen and the shifting from existing fishing grounds to new grounds also help to reduce fishing stress on same ground. Exploratory surveys for new fishing areas to be continued consequently map the potential fishing ground on a GIS platform and the data should be provided to the fishermen.

Sustainable and economically viable resources exploitation from deep sea fishery sector is still possible through regulatory management strategies with concerted efforts specific for different species and for different regions. In order to promote the deep sea shrimp fishery the government should provide adequate support and welfare measures to ensure that the cost of fishing operations tend to remain low variety thereby increasing the number of fishing operations. Technological lag and financial constraints had been the major bottlenecks in the delayed take off of the deep-sea fishing industry in India. Redesigning the fleet in order to reduce its size and, at the same time, improving the efficacy of the remaining vessels in order to increase their economic fitness will improve the deep sea fishing constraints for the future.

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