

## Push Net Fishing at Motta Gopuram and Siluvaipatti in Tuticorin, Gulf of Mannar, Southeast Coast of India

<sup>1</sup>T. Sivaramakrishnan, <sup>2</sup>V. Deepak Samuel and <sup>1</sup>Jamila Patterson

<sup>1</sup>Suganthi Devadason Marine Research Institute,  
44, Beach Road, Tuticorin 628 001, Tamil Nadu, India

<sup>2</sup>Energy and Environment Unit, UNDP,  
Gulf of Mannar Biosphere Reserve Trust (GoMBRT), 102/26, Jawan Bhavan,  
1<sup>st</sup> Floor, Devipattinam Road, Kenikarai, Ramanathapuram, 623 504, Tamil Nadu, India

**Abstract:** Fishes harvested through a specific gear called Push Net was recorded from January 2009 to December 2011 at Motta Gopuram and Siluvaipatti having a common landing centre along Tuticorin, South east coast of India. Among the total of 226.102 tonnes landed during the study period, there was a decline in harvested fish level from 82.750 t from January to December 2009, 74.943 t from January 2010 to December 2010 and 68.409 t from January 2011 to December 2011. Maximum landings were recorded for shrimps 161.284 t, followed by crabs with 23.413 t, cephalopods 14.562 t, snappers 5.564 t, goat fish 5.256 t, rabbit fish 4.213 t, parrot fish 3.416, anchovies 2.479 t and gastropods 3.048 t. In terms of percentage shrimps 71.33%, followed by crabs 10.35%, cephalopods 6.44%, snapper 2.46%, goat fish 2.31% and rabbit fish 1.86%, soles 1.28%, parrot fish 1.51%, anchovies 1.09% and gastropods 1.34%. Juvenile fishes, sea grass, sea weed and sponges were also brought ashore once this net is operated. Operation of this specific gear causes severe threat to marine benthic habitats.

**Key words:** Push net % Gulf of Mannar % Motta Gopuram % Siluvaipatti % Coral reefs % Sea grass beds % Sponges

### INTRODUCTION

Fishing activities of Gulf of Mannar still adopt the traditional practice though mechanization seems to have taken over. The fishery resource of Gulf of Mannar (GoM) is characterized by multi species of fin and shell fishes and rich biodiversity. Coral reefs, mangroves, sea grass beds and seaweed ecosystems are often referred to as “*life supporting ecosystem*” and harbor a variety of fauna and flora in the Gulf of Mannar region. Fishermen of this coast were largely depending on traditional fishing gears and exploited marine fishery resources before the 1960’s. After the introduction of destructive fishing techniques during mid 1960’s fisher folk landed high fish catches especially high value demersal shrimps. Due to this increment in fishing effort like push net and trawl net fishing techniques, the fishery resources and ecosystem like coral reefs and sea grass beds are impacted and

serious damage was caused to the marine bio diversity and which led to a sudden depletion of stock [1]. The fisheries sector has been recognized as a powerful income and employment generator as it simulates growth of a number of subsidiary industries and is a source of cheap and nutrient food, at the same time it is an instrument of livelihood for a large section of economically backward population of the country [2]. Gill nets can be selective, allowing some fish smaller than the mesh size to escape and are generally not damaged to benthic habitats. Fishing gears have different impacts on marine resources and habitats, depending on a variety of factors [3]. Push net fishing is a type of modified gill net fishing gear and it’s locally called knows as “*thallu madi*” This net causes serious effect on the benthic habitat and the dependent flora and fauna. This gear is operated from traditional country crafts called “*Vallam*” (Fig. 1). Commonly growing coastal populations, destructive



Fig. 1: Push net Operating at Motta Gopuram and Siluvaipatti

fishing activities, increasing use of modern fishing crafts and gears and coastal development have already caused considerable damage to a significant part of the coral reef areas and sea grass and seaweed areas in the Gulf of Mannar, the threat to the sustainability of the fisheries in India and particular in the Gulf of Mannar region [4]. The present study focuses on the fishing methods that ensure the sustainability of marine resources and need of awareness to conserve the marine habitats from destructive fishing techniques.

### MATERIALS AND METHODS

Weekly observations were made at Motta Gopuram and Siluvaipatti fish landing sites and stratified multi-stage random sampling technique was followed [5]. Data on catch and species composition were collected from January 2010 to December 2012. The data was analyzed applying two - way ANNOVA for statistical interpretation.

### RESULTS

Push net landing for the entire study period of 3 years from January 2009 to December 2011 was 226.102 t. There was an annual decrease in landing tonnage from 82.750 t during January '09 – December '09 to 74.943 t from January '10 – December '10 and 68.409 t from January '11 to December '11 as depicted in the Figures 2, 3 and 4. Throughout the study period, shrimps dominated the catch followed by cephalopods and crabs. The minimum most landings were recorded for gastropods. While shrimps landed more during the month of November during 2009 (Fig. 3) during 2011, the maximum landings were recorded during the month of October (Fig. 4).

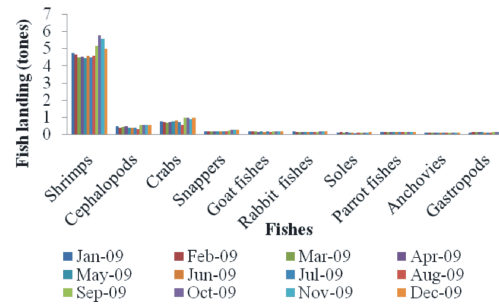


Fig. 2: Fish landing data from January 2009 to December 2009

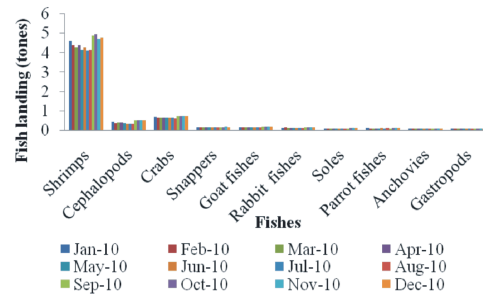


Fig. 3: Fish landing data from January 2010 to December 2010

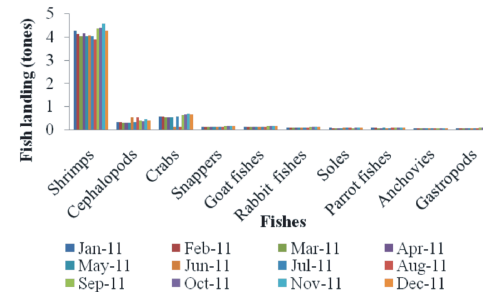


Fig. 4: Fish landing data from January 2011 to December 2011

Among the all months, September, October, November and December were peak seasons for fish landing. When compared to the total catch, shrimps landed highly with 161.284 t and followed by crabs with 23.413 t, cephalopods (14.562 t), snappers (5.564 t), goat fish (5.256 t), rabbit fish (4.213 t), parrot fish (3.416 t), anchovies (2.479 t) and gastropods (3.048 t) (Table 1). In terms of percentage expression, more than 71% was dominated by shrimps. Since this gear is shrimp specific modified gear, cephalopods, crabs, fishes and gastropods were incidental catches. This was followed by crabs (10.35%), cephalopods (6.44%), snapper (2.46%), goat fish (2.31%), rabbit fish (1.86%), soles (1.28%), parrot fish (1.51%), anchovies (1.09%) and gastropods (1.34%). Juvenile fishes, sea grass, seaweeds and sponges were brought ashore as by catch.

Table 1: Total fish landing data from January 2009 to December 2011

Fishes	2009	2010	2011
Shrimps	57.756	53.421	50.107
Cephalopods	5.24	4.833	4.489
Crabs	9.315	7.957	6.141
Snappers	2.255	1.75	1.559
Goat fishes	1.866	1.767	1.593
Rabbit fishes	1.648	1.388	1.177
Soles	1.067	0.972	0.858
Parrot fishes	1.405	1.056	0.955
Anchovies	0.883	0.844	0.752
Gastropods	1.315	0.955	0.778
Total	82.75	74.943	68.409

Two way anova: Total landing data for ornamental fishery from January 2009 to December 2011

ANOVA						
Source of Variation	SS	df	MS	F	P-value	Remarks
Between years	7257.35	9	806.372	576.615	2.8E-20	P>0.005
Between fishes	10.3102	2	5.15511	3.68628	0.04552	P>0.005
Total	7292.83	29				

Two way ANOVA for analysis between years and fishes prove statistically not significant (P>0.005)

### DISCUSSION

Shrimp fishing nets usually fish shrimps and other seafood's as by catches [6] and destructive fishing practices kill huge amount of non target species and young ones of commercially valuable species. This method of fishing mechanically disturbs the sea bottom and causes injures to a wide variety of marine benthic creatures [7]. Once the habitat is dented and the organisms are killed, it takes an extensive period for organisms to colonize or dwell in the same environment. The Tuticorin coast is one of the most environmentally stressed coastal area in the Gulf of Mannar and is strained by decreasing fish catches; the fishermen are often compelled to use more effective and also destructive fishing methods, which reduce the productivity of the reefs even further [8]. Anthropogenic pressure polluting marine environment is supported by increased fishing pressure leading to either loss of resources or destruction of their habitats. Push nets are operated by country crafts called vallams and mainly target shrimps for harvest. In Thailand, the important gears are trawl (37%) gill net (34%) push net (16%) and purse seines (7%) [9]. Present study reveals that push nets are being operated at considerable levels in shallow waters in the area of concern. They are only secondary to the trawlers that operate in the same area but beyond the traditional fishing zones. Sometimes trawlers operate int these areas creating a lot of problems to fishermen who fish in country crafts.

The impacts of destructive fishing practices can be direct or indirect. Direct effects are generally easily and rapidly detected such as destruction of local habitats. Bottom trawling and dredging on benthic environments and communities with well-developed epifauna (such as sea grass, algal or bryozoan beds; tropical coral reefs, cold water corals and sponge reefs) will be directly destructive when the structural complexity of the original habitat is removed and cannot replace itself. Indirect effects endangers larval forms - 'juveniles' and its survival by damaging their living habitat; releasing fatal contaminants trapped in the sediments and increasing natural mortality by reducing structural protection in complex habitats [10]. This is a supported view through the present study as it throws light on how a specific gear can be destructive to the environment while the target catch is good. Often fishermen are unaware of these consequences since their only livelihood is fishing.

Fisheries and aquaculture activities have been the means of livelihood for the small scale coastal fishing communities from time immemorial. Even though the fisheries have now become a market-driven dynamically developing sector, the subsistence and decentralized forms of fisheries remain resilient in Asia [11]. It is widely quoted that the depletion is due to the introduction of trawler fishing techniques, which are scrape, the bottom of the sea and end up catching juvenile fish [12]. The present study also destructive fishing gear, like push net cause heavy damage to marine ecosystem.

## CONCLUSION

Push net seems to be an important fishing practice adopted especially in Siluvaipatti and Motta Gopuram hamlets in Tuticorin coast of Gulf of Mannar, Southeast coast of India. Fishermen have been operating these gears for quite some time though there are deleterious effects sounded on the environment by its mode of operation. The non-target catch composition is usually made of Seagrass communities, reef associates, sponges, seaweed and juvenile fin and shell fishes. Efforts by Gulf of Mannar Biosphere Reserve Trust in spreading conservation and awareness messages to the fishing community has made some dent in reduction of its operations especially in sensitive areas. Repeated awareness creation and community managed fishing operations will aid in efficient conservation as initiated by the UNDP-GEF project in the Gulf of Mannar area.

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