

## Trend of gillnet fishery along the Maharashtra coast of India: A case study



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### HIGHLIGHTS

- Catch composition of single-day and multiday gillnetters was studied.
- Highlighted the changes that have taken place in the fish catch composition and gillnet fishing operations.
- Specifications of crafts and gears involved in multiday and single-day gill net fishing were discussed.
- The findings would help policy makers in the development of conservation strategies and regulatory agencies for imposing fishing fleet restrictions.

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### ABSTRACT

In the context of increasing fuel prices in fishing operations, low impact fuel efficient (LIFE) fishing practices such as gillnetting assume significance globally for sustainable development of fisheries. Satpati, which is well known for the dominance of mechanised gillnet fishing is an important marine fishing zone of Maharashtra along the north west coast of India. Considering the relevance of fuel efficient fishing methods, the present study focuses on highlighting the importance of gillnet fishing and to document the several changes that have taken place in the fish catch composition and fishing operations in the gillnet fishery at Satpati during the last few decades. The catch data were collected by fortnightly sampling from the single-day (lobster gillnetting) and multiday (pomfret and seer fish gillnetting) gillnet fishing. Specifications of crafts were recorded in the pre-scheduled questionnaire and by physically sampling the units. The study analysed the catch composition of all the three representative units that revealed a change in the trend of species composition over the years. The contribution of pomfrets to the total marine fish landings of Satpati had reduced from 30% in 1987 to 20% in 2015. This can be mainly attributed to the usage of smaller mesh size and increase in juvenile catch of pomfret over the past few years. In this regard, results of the present study with regard to assessment of the present scenario of the mechanised gillnetter fleet at Satpati would be useful to decision makers for imposing fishing fleet restrictions.

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### 1. Introduction

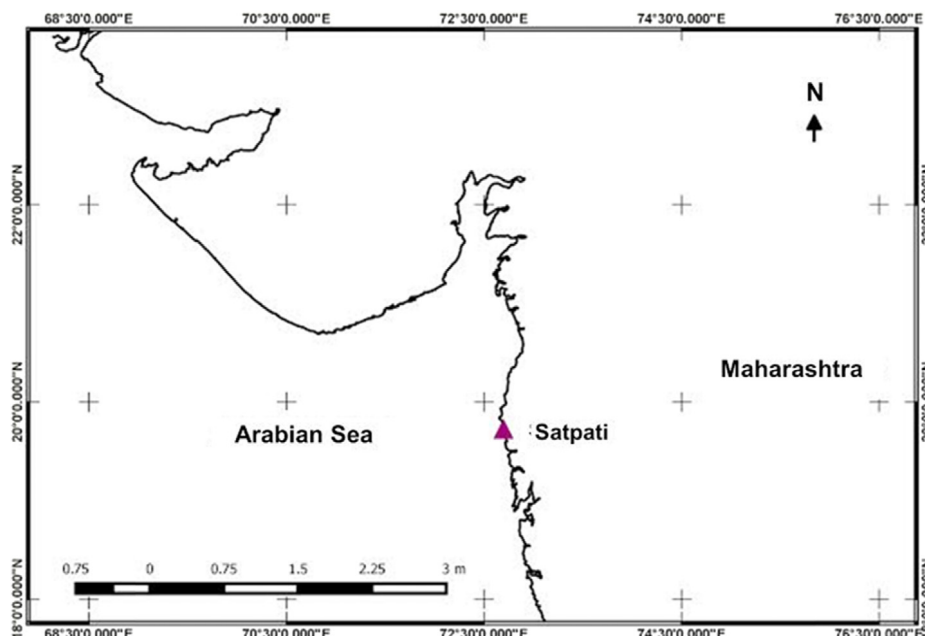
Overfishing, destructive fishing practices, pollution and coastal development are some of the major issues facing the marine fisheries sector all over the world (Garcia et al., 2003; Deshmukh, 2013). There is growing consensus for promotion/adoption of low impact fuel efficient fishing practices. Gillnet fishing being a low energy method neither spends fuel on towing net nor damages the fishing ground. Deploying such fishing methods becomes essential

in the context of adopting the guidelines of Code of Conduct for Responsible Fisheries (FAO, 1995). Large and average size fishes of better quality are captured by these gears since they are handled individually (Johnstone and Mackie, 1986). Gillnets are widely recognised as efficient and 'selective' type of gear (Bjoringsoy, 1996). Single-day fishing is beneficial for resource conservation by reducing the discards whereas multiday fishing results in large amounts of discards and post-harvest losses. In terms of fuel efficiency, single-day fishing is more fuel consuming and less efficient while, multiday fishing is economical and generates higher gross revenue per fishing trip by saving the fuel cost.

Maharashtra, with a coast line of 720 km is one of the major contributing states to marine fish production of India. Satpati is special fishing zone which, is devoid of any trawling activities. It

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**Fig. 1.** Map showing geographical location of study area.

has the highest number of gillnetters and major fishing activity is gillnetting which contributes significantly to the marine fish catch of the state. Major species in the catch consists of elasmobranchs, catfishes and pomfrets (Anon, 2014). The fishers of Satpati observe self-imposed extended fishing ban to sustain fish catch and avoid juvenile catch in the post monsoon season. Gillnets for catching pomfret and seer fish were operated by multiday gillnetters while those for lobster were operated by single-day gillnetters.

To support the increasing demand for food, high rate of exploitation of fish beyond the existing levels became necessary. The need for increasing fish catch coupled with saving fuel by staying out at sea for more than a night led to the idea of multiday fishing. The technical specifications of fishing gear and craft, capital investment, catch composition and revenue for single-day and multiday units differ drastically. While several studies were carried out on different aspects of gillnet fishery in different parts of the world, studies on changes in the catch composition and structural changes in fishing craft and gear of gillnet fishery based on single-day and multiday fishing are rare.

The increasing fishing pressure and the diminishing returns had led to the shift towards multiday fishing in coastal waters of the North West coast of India. In this backdrop, investigations were carried out at Satpati, Maharashtra with the objectives of studying the changes in catch composition of gillnets and structural changes in fishing system as a consequence of shift to multiday fishing. Fishing fleet restrictions would help to sustain gillnet fishery of the region in the coming years.

## 2. Material and methods

### 2.1. Study area

Satpati is located in the Thane district of Maharashtra, India (Fig. 1). Investigations were carried out during August 2014–April 2015. Data regarding the specifications of fishing vessels was collected based on structured questionnaire and by physically sampling the units. Gillnetters were classified into multiday and single-day units based on the number of fishing days as per Hassan and Sathiadhas (2009). Fishing vessels which carried out fishing for more than a day were classified as multiday units and those that

fished either for a day or half a day as single-day units. Accordingly, seer fish and pomfret gillnetters are classified as multiday units while lobster gillnetters are classified as single-day units.

### 2.2. Sampling frame for Catch estimation

Fish landings of both the single-day and multiday gillnet fishing were observed and recorded on fortnightly basis. The number of boats landed and number of landing days were observed and recorded through actual observation and enquiry. Estimation of total monthly catch was done following stratified multi-stage random sampling adopted by Alagaraja and Srinath (1980). Catch composition of multiday and single-day gillnetters was estimated separately based on resource-specific gillnets. The details of monthly fishing operations and catch composition of multiday gillnetters (pomfret gillnet, seer fish gillnet) and single-day gillnetters (lobster gillnet) were collected from the selected commercial mechanised fishing units. The catch of the randomly selected 5 units (each from units for pomfret gillnet and seer fish gillnet) from multiday fishing and 2 units from single-day fishing was segregated into groups and identified up to species level as many as possible at the landing centre.

### 2.3. Specifications of craft and gear

A structured data collection schedule was formulated for gathering information of design parameters, viz., vessel type and name, length overall, breadth, depth and draught, gross registered tonnage, engine horsepower and number of cylinders, number of crew per fishing trip, year of construction, type of gear used, and mesh size. Detailed information regarding design of craft was collected partly by physically sampling the units in operation, from the Vessel Registration Certificates as well as by interaction with the craft owners and fishermen cooperative societies.

## 3. Results and discussion

### 3.1. Catch composition

Details of landing observations of lobster gillnet, pomfret gillnet and seerfish gillnet are given in Table 1. Multiday vessels

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