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Present fishing techniques and related issues in chilika lagoon, Odisha

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Abstract

Chilika lagoon is the largest lagoon in India. It covers an area of about 1100 sq km. This lagoon is facing physical, ecological, and social challenges in recent years. It supports the livelihood of millions of people in the coastal state of Odisha, India. Presently, traditional fishermen face challenges from present fishing techniques. This paper investigated the past and present fishing techniques used by lagoon fishermen communities. This paper also investigated the impact of present fishing methods on the lagoon ecosystem and fishing communities by using field surveys and geospatial technology.

Keywords: Lagoon, chilika, fishermen, fishing net

Introduction

Lake Chilika has been rich in fish resources since ancient times. In the early 19th century, a major portion of fish was consumed by local fishermen and the non-fishermen population, and some parts were sold in the local market. After the introduction of the railway, Chilika became an important fish supplier to Kolkata from the time of the First World War. Fish is also supplied to Mumbai, Puri, Assam, etc. Huge production with nominal local demand and fast transport system has made the region favorable for fish supply.

Salinity in the lagoon area is a major determinant of fish distribution. The salinity of the lagoon varies spatially and temporarily. The supply of freshwater from the tributaries of the Mahanadi like Daya and Bhargavi controls the lagoon ecosystem. The mixing of fresh water with salt water keeps the environment of the lagoon healthy. The closing of the new mouth reduces the flow of salt water and can turn the lagoon into a freshwater lagoon in the near future. Over time, with the change in the natural environment, the method of fishing in the Chilika lagoon region is also changing. The method of fishing has changed in line with the economic comfort and needs of the present people. Increasingly modern methods are causing severe damage to fishery resources and lagoon ecosystems of Chilika. Current fishing methods and their effects are discussed here.

Types of fishing

There are two main types of fishing in this lagoon area and these are commercial fishing and traditional fishing. Nets and traps are used to catch fish, shrimp, and crabs throughout the year.

Types of fishing nets

Different types of nets are used for fishing in Chilika Lagoon. There are two types of nets such as gill nets and dragnets. Small nets for small fish and large nets are used for large-sized fish. Some nets are specific to certain fish.

Gillnet

The gill net hangs vertically like a straight panel in the water. Above it is a floating line with floating material or plastic balls and below it is a weighted ground line. There are two local names for fishing gill nets – 'Menjajalo' and 'Khaingajalo'. These are long nets of various mesh sizes. Khainga fish is caught by 'Khaingajalo'.

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Dragnet

A dragnet is a long net that usually runs from the bottom of a pond to a fishing boat. Fishermen use different types of drag nets like 'Vetkijalo', 'Khadijalo' and 'Manijalo' for fishing.

Traps

Shrimp, crabs and fish are caught in these bamboo curtain traps of different shapes and sizes. 'Dhaudi' and 'Jhumibaja' traps are used for fishing.

Traditional techniques of fishing

Among the traditional fishing techniques 'Dian', 'Uthapani', 'jano', 'Bahani' and 'Baja' are important. These fishing techniques are practiced by some traditional fishermen.

Dian

'Dian' is a very small traditional fishing method that is operated through the 'jano' fishing area. The 'jano' fishing area is surrounded by 'Dian'. Although this technique is used throughout Chilika, the fishing process is declining. Different types of fish are harvested between May and September using 'Dian'.

Jano

'Jano' is the most common method of fishing. It is a wide bamboo enclosure that separates fish from shallow water off the coast of Chilika. These fish are kept captive for regular catching until the enclosure is dry. All the fish were caught before the fish fields dried up. Most of the 'jano' grounds are in the lagoon margin and south of Tua. 'Jano' fishing grounds are turning into illegal shrimp 'Gheri'. By 1960, more than 112 'Jano's were operating across an area of 135 sq km, but in 1993 it dropped to only 83 (Panda *et al.*, 2008) [9].

Uthapani

'Uthapani' is a small traditional fishing method. It is mainly found in Parikud and Malud Island areas. At the onset of the first rains, concentrated rainwater enters the Chilika and catfish move in the opposite direction to the flow of water, and jump into the shallow earthen enclosure around the shores of the lagoon.

Bahani

Fishing in Chilika is known locally as 'Bahani' which is performed in open lagoon water. Typically, dragnet and gill nets of various specifications and local names are performed with the help of plank-built flat bottom boats. Fishing takes place throughout the year, especially in leased-out areas.

Fishing hooks and line

The practice of this fishing is mainly in the area, especially in Balugaon and Rambha. Fish heads, shrimp heads and earthworms are used for fishing with a hook.

Chingudi khattis

'Baja' and 'Dhaudi' are traditional shrimp catching techniques. At present these are replaced by 'Khanda'.

Modern fishing techniques

There are different types of fishing techniques are using by fishermen of Chilika Lagoon. They are also adjusting their livelihood to different contemporary issues. Among the fishing techniques 'Khanda', 'Gheri' and fish farm plots are important in current fishing techniques.

Khanda

Currently, the most widely used fishing technique is 'Khanda'. It covers almost all parts of the Chilika water cover area. Fishermen describe this fishing technique as a death trap. This method is used throughout the year. Small fish, shrimp and crabs of all sizes are caught in this trap as the size of the net is very fine. Traditional fishermen are severely affected by the 'Khanda' area and boat transport is also severely affected by these types of fishing.

Gheri

'Gheri' is also most commonly used in Chilika for fishing. The traditional 'jano' fishing area is transformed into a 'Gheri' fishing ground. A high concentration of Gheri is mainly observed in the lowland Tua-Gambhari and Pansapada areas. The main part of the enclosure is used as a shrimp farm and some part is used for other fish farming. Some enclosures are fixed to the earthen wall while others are directly connected to the lagoon surrounded by mesh. Net enclosures are constantly benefited by the nutrition of the lagoon water, but mud enclosures are limited by this connection to the lagoon and these enclosures are filled with rainwater and dry up in April-May. The mud enclosures of the island are home to waterfowl but now they are displaced from their habitat.

Review of literature

In Chilika Lagoon various types of fish are available which have been described by several authors like Hunter (1872) [4], O'Malley (1908) [8], Annandale and Kemp (1915) [2], Chaudhury (1916) [3], Jones and Sujansinhani (1954) [6] and Rao (1967) [10]. Many authors have written about different types and use of nets (Jhingran and Natarajan, 1969) [5] and boats (Scott, 1989) [14] in this area. Over time, various authors (Sekhar, 2004; Sahu *et al.*, 2014; Samal and Meher, 2003; Mohanty *et al.*, 2009) [15, 11, 13, 7] have pointed out the problems of Chilika Lagoon. Some authors highlighted the changes in fishing techniques in the lagoon (Panda *et al.*, 2008; Aducci, 2009) [9].

Material and Method

To assess the lagoon environment different methods have been applied such as field surveys, water quality measurements, bathymetry surveys, fisherman surveys at the lagoon and door-to-door household surveys in the fishing villages. Lagoon geomorphology has been studied using different types of field surveys. To assess the condition of the fishing community, 200 fishermen families have been surveyed around the lagoon fringe. Over 100 fishermen were surveyed at the lagoon to assess changes in lagoon fishing types. Satellite image analysis has been carried out at regular intervals from 2010 to 2015. Changes in water quality and lagoon biology have been identified during the survey period. Changes in fishing techniques and related problems have been identified.

Conclusions and Discussion

The lagoon environment at the time of the survey was more or less the same with some instability. The salinity regime of the lagoon changes seasonally and this controls the lagoon fish distribution (Sahu, *et al.*, 2014) [11]. Lagoon geomorphology controls the lagoon water flow and mixing and also controls lagoon salinity distribution. It also observed that changes in lagoon fishing techniques affected

fish distribution over the lagoon. According to the fishermen survey, most fishermen believe that recent changes in fishing practices will be detrimental to the lagoon fishing community. 'Khanda' and 'Gheri' fishing techniques are the most harmful to the open lagoon fishing community.

From the analysis of satellite images and field verification from 2010 to 2015, this type of fishing has been found in 3 dominant areas where freshwater or saltwater and saltwater are mixed. The most important regions are Satapada, Palur and Daya-Bhargavi confluence.

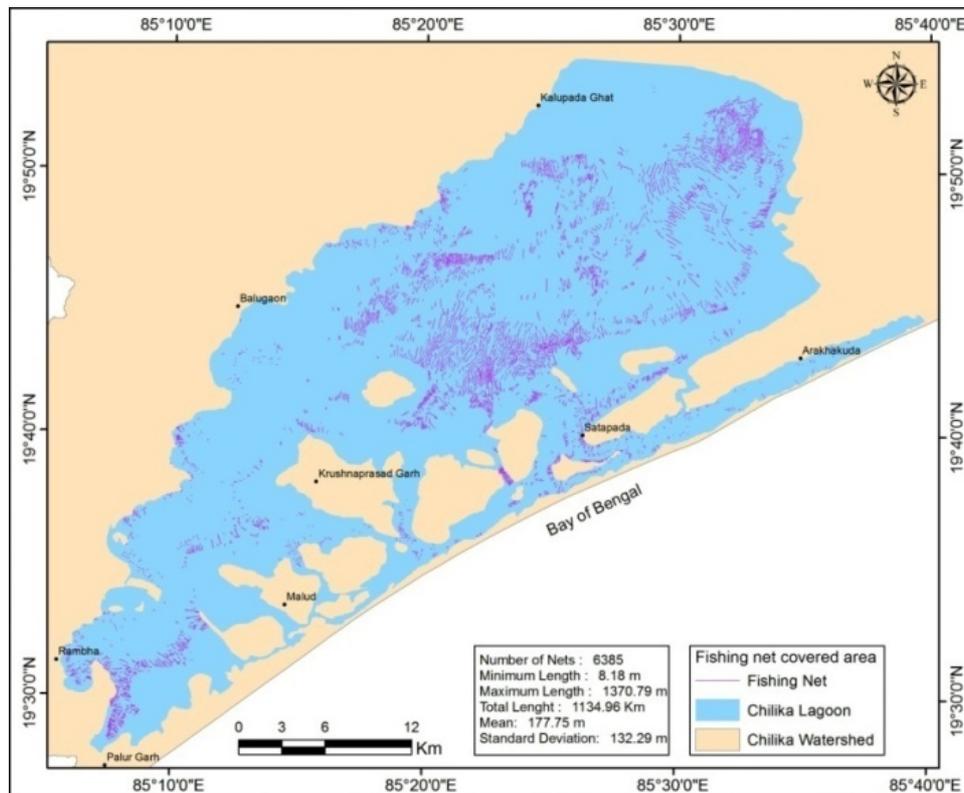


Fig 1: Fixed net (Khanda) in Chilika lagoon

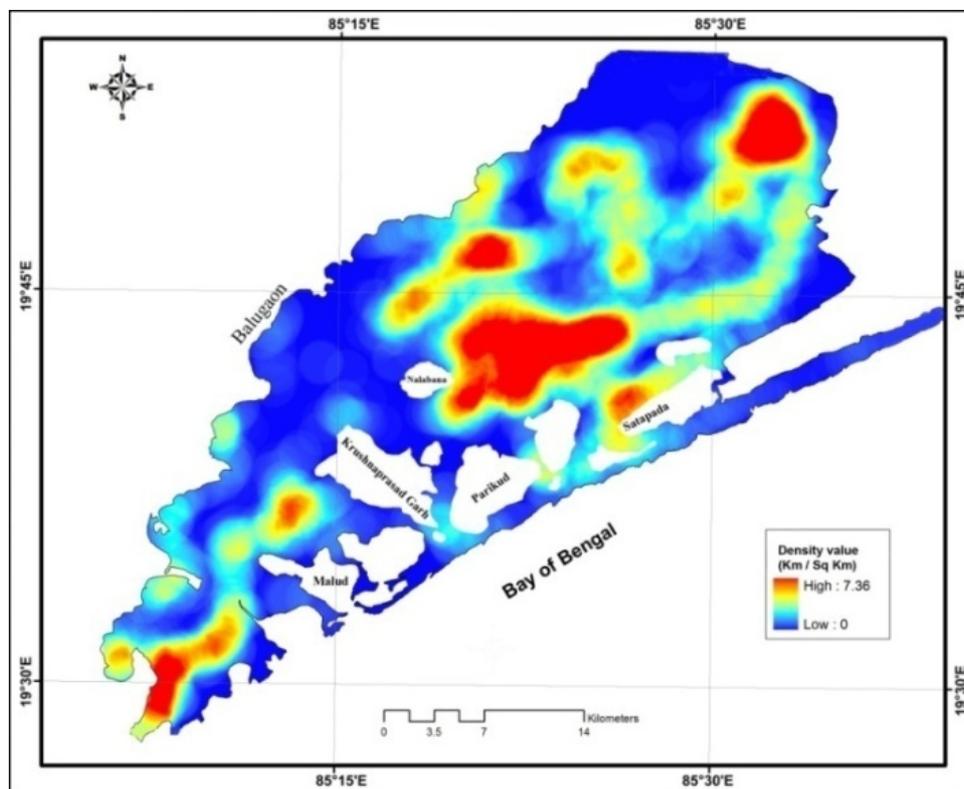


Fig 2: The density of 'Khanda' in Chilika lagoon.

The average length of a 'Khanda' varies from 50 to 300 meters in different parts of the lagoon. The total length of

the 'Khanda' in 2011 was 1135 km (Fig 1.). The highest density of 'Khanda' is observed at 7.3 km per sq. km in a

mixing zone in the middle part of the lagoon. (Fig 2). In the other hand 'Gheri' covers an area of about 439 sq. km and it has a significant negative effect on the ecology and environmental system. The figure above shows that most of the 'Khanda' is observed in the mixing zone of the lagoon and most of the 'Gheri' is observed at the lagoon fringe. According to fishermen 'Khanda' and 'Gheri' restrict the free movement of plankton, micro and macro animals and various juveniles. These fishing techniques also restrict the reproductive activity of anadromous and catadromous and significantly reduce different fish and shrimp populations of the lagoon. This restriction of biological movement can change lagoon biota in the near future. According to fishermen 'Khanda' and 'Gheri' fishing creates an occupational displacement of traditional fishermen communities of the Chilika Lagoon moreover, the 'Gheri' area is surrounded by long nets, making it difficult for fishermen to enter and exit the lagoon.

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