

PRELIMINARY STUDY ON SHRIMP PRODUCTIVITY AND FISHERY ISSUES OF MULLAITIVU LAGOONS, SRI LANKA 2013 - 2015.

A. Ashani*^{1,2}, J. Suthagaran¹ and K. Akilan¹

¹*Department of Fisheries & Aquatic Resources, Sri Lanka*

²*Post Graduate Institute of Agriculture, University of Peradeniya*

**Corresponding Author (email: ashaarul1904@gmail.com)*

Introduction

Lagoons are one of the significant coastal ecosystems playing vital role ecologically and economically to its' habitant and humans. In Sri Lanka, there are 82 lagoons present along the 1338 km of its coastline in diversified nature [1]. Among them, northern region of Mullaitivu has four productive brackish water lagoon systems named as Chalai, Nanthikkadal, Naayaru and Kokkilai. These four lagoons comprise 9233 ha area of watershed [2]. As well as the coastal length of Mullaitivu is 70km from Pepparaippiddy to Kokkilai. Even though there is a large coastal area in the Mullaitivu, lagoons have great potential directly in shrimp fisheries. They have indirect values of anchorage, ecotourism, bird watching, coastal photography, aqua scenic beauty, film shooting, scholarly values, education spots and cultural stimulus. They are barely explored when compared to other lagoons systems in Sri Lanka due to the last three decade civil war.

Artisanal shrimp fishing is one of the dominant activities in the lagoons which provide high economic values to the community who depends on fisheries [3]. Since, prawns are one of the tasteful and most important traded commodity, they have good market demand too [4]. Lagoon and shrimp productivity of a lagoon basically depends on the lagoon area where the configuration of lagoons, linkage between sea and interaction with other coastal ecosystems like mangrove swamps determine the richness of it [1]. Thus, the resource exploitation and management is a great deal to local fisher folk and authorities. According to the Fisheries and Aquatic Resources Act No.2 of 1996 which is implemented by Department of Fisheries and Aquatic Resources only active gears like gillnet with mesh size above 85mm and cast net are preferred for lagoon fishing. Non-motorized boats such as canoes and theppam are also used in the lagoon fishery. However, illegal fishing methods and conflicts between local and outdoor fishermen for resource harvesting are the major issues in the fisher [5]. At this, when consider the north-eastern part of Sri Lanka which is a war-torn area has no reliable reports on any type of fisheries activities and issues to date. Thus, this preliminary study is an attempt to address the recent drifts of shrimp production in the four lagoons of Mullaitivu in order to fill the gap in the baseline data and to provide the current picture of lagoon resources and conflicts on shrimp fishery prior to implement the conservation and management activities of lagoon resources in a sustainable way.

Materials and Methods

Data Collection

Shrimp fishery catch data and other available information were consolidated with regard to artisanal shrimp fishery activities such as spatial data, temporal data (year, month etc.) and operational data from the Mullaitivu district office of Department of Fisheries and Aquatic Resources (DFAR). Also, direct observations were conducted to Chalai, Nanthikkadal, Naayaru and Kokkilai lagoons (Figure 01) during the study period (2013 to 2015). Shrimp productivity and total lagoon productivity of each lagoon were calculated in terms of average annual shrimp production per km² and average annual total lagoon production per km² for all four lagoons respectively.

Fishery issues were identified via open-ended interviews with small focus groups. These groups were composed of Fisheries' Inspectors, Fisheries Federation Presidents, each Fisheries Society presidents and selected society members from the relevant fishing areas. All data were confined to the DFAR reports since fishery statistics data recording and legal aspects were handled by fisheries department officers who involved in law enforcement and surveillance of fisheries. Data were analyzed using Microsoft Office Excel.

Study area:

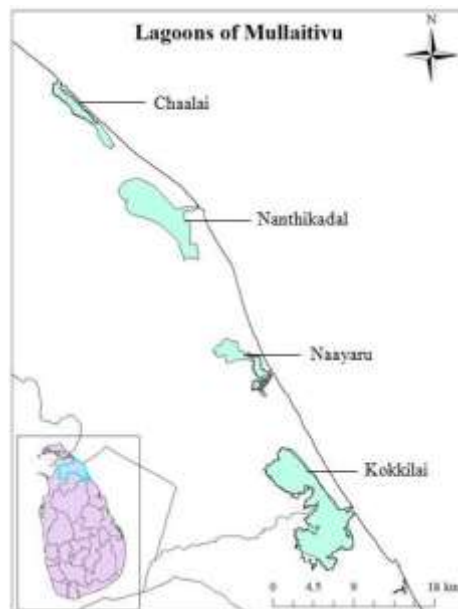


Figure 1: Locations of lagoons in Mullaitivu

The locational pattern of four lagoons in Mullaitivu district in the northern region of Sri Lanka show distinct topographies on its configuration, size, and extent. The water shed area of Chalai, Nanthikkadal, Naayaru and Kokkilai are 14.6 km², 46.792 km², 17.60 km² and 53.491 km² respectively [1]. Even though these lagoons embrace

ecologically and economically important resources, the status of fisheries in Mullaitivu is virtually unknown due to the post war era and lack of scientific studies. The statuses of resources in all these lagoons are categorized as “somewhat good” [1].

Results and Discussion

Mullaitivu lagoon fishery is operated in the artisanal way with three types of gears mainly gillnet, castanet and traditional non-mechanized crafts (canoes). The fishermen who engage in the lagoon fishing are categorized into two groups such as fulltime and part time. According to this study, most of the fishermen who engage in marine fishing do part time in lagoon too. Year round fishing operations are going on in all the lagoon areas. Generally, a fisherman spends about 4 to 8 hours per trip in a day for their fishing. Gillnets with mesh size of more than 85 mm is frequently used for catching prawns.

Peaneus monodon, *Peaneus indicus*, *Peaneus semisulcatus* and *Metapenaeus sp.* were the main shrimp species and *Peaneus monodon* was the abundant and dominant catch in the shrimp fishery. The average annual shrimp catch percentage in relation to the total annual lagoon production of 2013, 2014, and 2015 were shown in Table 1. Generally, peak season for all lagoons were observed in May to September. Yearly catch of shrimp was increased in Chalai, Nanthikkadal and Kokkilai, while oscillation was observed in Naayaru (Figure 2 and 3). The fluctuations in the Naayaru lagoon may be due to the conflicts between native and outdoor people resulted to setbacks to some fishing societies. In addition, due to the separation of lagoon with road and bridge construction may disturb the water exchange and cause the decline in shrimp catches [1]. Highest shrimp productivity was observed in 2015 at the Kokkilai lagoon by 476.85 kg/km² next to Nanthikkadal 388.87 kg/km². Shrimp fishing was absent during June to December 2015 in Chalai lagoon due to drought. Bridge across the Nanthikkadal lagoon, near the marine entrance is 440 m long may alter salinity regimes and sediment transport resulting in reduced productivity than its nature condition [1].

Table 1: Annual shrimp production percentage (%) related to annual total fisheries production in Mullaitivu

Lagoons of Mullaitivu	2013(%)	2014(%)	2015(%)
Chalai	23.63	60.88	37.44
Nanthikkadal	43.72	45.58	50.72
Naayaru	30.92	29.88	25.60
Kokkilai	40.99	32.10	34.86

Issues of these lagoons are categorized into natural and anthropogenic burdens. Common natural problems are numbers of crocodiles in the lagoon which disturbs the reproduction of the turtle and fishing, drought during June to December usually in the Chalai lagoon and sand deposition blocks the channel near to lagoon mouth area. Human-induced forces influence lagoon ecosystems concomitantly as direct and indirect ways. Zero level management practices, conflicts between native and outdoor fishermen, illegal fishing activities, no lagoon demarcations, poor capital investment and lack of marketing opportunity are the socioeconomic (indirect) issues.

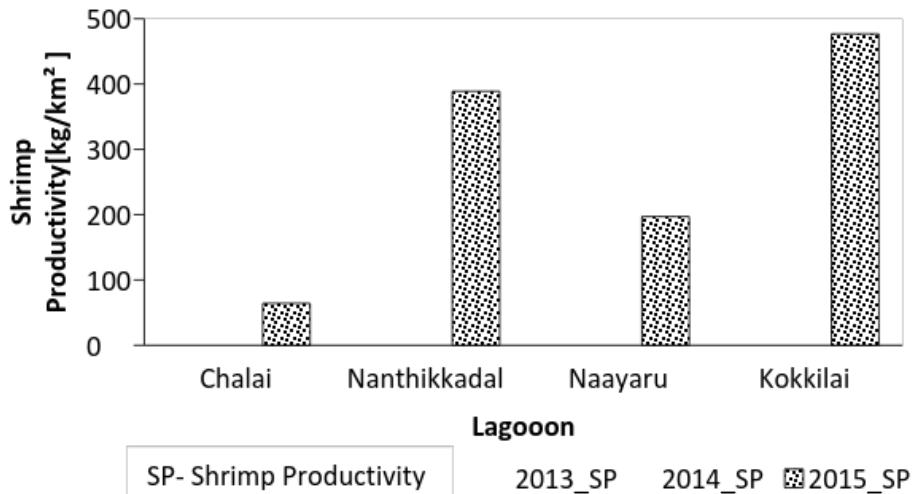


Figure 2: Shrimp productivity in Mullaitivu lagoons from 2013 to 2015

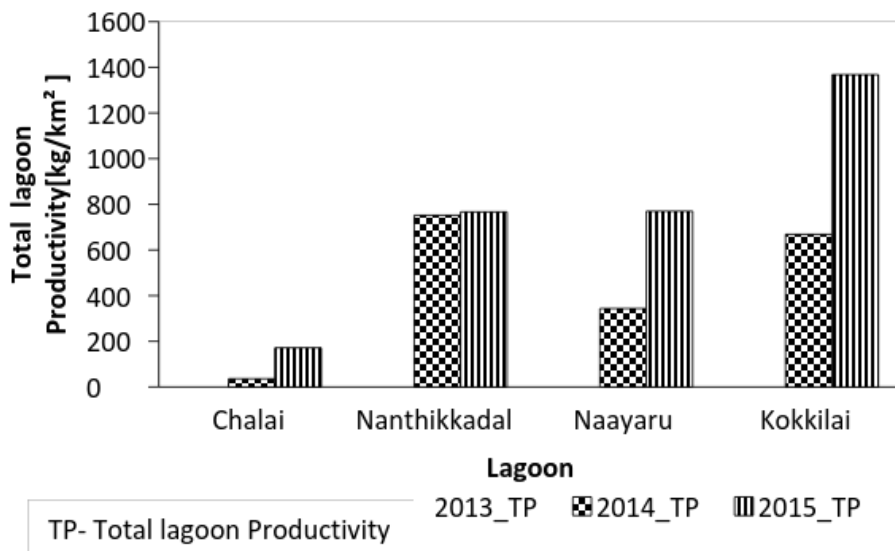


Figure 3: Lagoon productivity in Mullaitivu lagoons from 2013 to 2015

Besides, local and outside fishermen engaged in intensive fishing activities by using banded monofilament nets going on all over the sides of Nanthikkadal lagoon create further conflicts. Kokkilai and Nanthikkadal lagoon area are the most problematical for sharing property rights of fishing. Further, other direct issues were viewed as garbage dumping close to lagoon mouth area and destroying mangroves. Severe threats to Kokkilai, Nayaru and Nathikkadal ecosystems are illegal fishing methods which disrupt the habitat, disturbance of fishing by blasted parts of weapons, military concrete posts, dented roads and rehabilitation developmental activities including housing, road and bridge construction.

Conclusions and Recommendations

Peaneus monodon was the abundant and dominant catch in the shrimp fishery. Yearly catch of shrimp was increased in Chalai, Nanthikkadal and Kokkilai, while inconsistency was observed in Nayaru due to the conflicts between native and outdoor fishermen. Kokkilai and Nanthikkadal are the most productive lagoon systems in terms of their water shed area than the Nayaru and Chalai. Illegal intensive fishing methods, garbage dumping and conflicts for sharing fishery resources are the main issues in the Mullaitivu lagoons. Hence, issues of lagoon ecosystems, showing the urgent actions by the relevant authorities to regulate the exploring patterns of resources socioeconomically positive way to the native people who bank on the lagoon fishery of Mullaitivu district.

Recommendations

Management measures and regulations should be implemented to control the issues and overfishing in shrimp fisheries by imposing catch limits, limiting participation, restrictions on gears, stock enhancement, closed seasons, closed areas, mesh sizes and control the shrimp landing sizes. Conflicts with fishermen can be addressed by proper zonation and time-sharing of fishing grounds.

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