

Patterns of species composition of beach seine fisheries off North-Western coast of Sri Lanka, fishers' perceptions and implications for co-management



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ABSTRACT

As in many developing countries, small-scale fisheries including beach seining contribute significantly livelihoods and food security of coastal communities. Beach seining in Sri Lanka is seasonal mainly during calm season deprived of strong monsoonal winds, and essentially a multi-species fishery. Knowledge about the seasonal occurrence of pelagic species is important to be known for proper planning of the fishing activity, especially due to the reason that beach seine fishers in many parts of Sri Lanka make decisions to attach the cod-end of correct type depending on the target species. The possibility of identifying pattern of seasonal occurrence of target fish species in beach seine fishing sites off the southern region of north-western coast of Sri Lanka was therefore investigated using Self Organizing Maps (SOM). The analysis indicated that beach seine fishers' local knowledge to predict the occurrence of certain species in the fishing sites to adjust their fishing strategies to target desirable species was consistent with the findings of SOM approach. Consequently, it was concluded that as beach seine fishers use indirect indicators such as colour of sea water and behaviour sea birds predict the species occurrence fairly accurately, their local knowledge can be incorporated in the management planning of beach seine fisheries in the North Western coastal area of Sri Lanka.

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1. Introduction

Small-scale fisheries contribute about 50% of the global fish production, and employ more than 90% of the world's capture fishers and fish workers, about half of whom are women [1]. In addition, as many impoverished communities in the coastal regions, especially in the developing countries, may not have ready access to food sufficiency, small-scale fisheries are a critical source of dietary protein and micronutrients for the people [2,3]. However, the importance of small-scale fisheries for sustainability has not been fully realized in many regions and as a result, small-scale fishers are often marginalized despite their contribution to national economies and food and nutritional security of humanity. Beach seining is one of the traditional coastal fishing methods widespread in many parts of the world [4]. Although the global trend of the beach seining is that over the last few decades, the importance of beach seining in terms of contribution to the national fish production has declined in many parts of the world, in

countries like Benin, Mozambique and Togo beach seine fisheries account for over 60% of total marine fish production [5]. In Sri Lanka, there are 898 licensed beach seine sites around the coastal belt of Sri Lanka, where 1,098 beach seines are reported to operate, and their annual fish production in 2014 was about 17,800 MT which accounts for about 6.4% of annual fisheries production in the coastal sector of Sri Lanka (Unpublished data from the Industries Division of Department of Fisheries and Aquatic Resources).

The beach seines used in the coastal fisheries of Sri Lanka, consist of a seine body also termed as cod-end, wings, foot (ground) ropes, head ropes and hauling ropes (Fig. 1). Mesh size is relatively small in the cod-end and gradually become larger towards the mouth of the net [6]. Twine thickness may range up to 27 ply to provide sufficient strength to tolerate the pressure from large catches. Cod-end of the beach seine is cone shaped and is made of nylon netting. Length of the body ranges from 10 to 15 m. The average width at the seine body net is about 12 m and the width of the cod-end net is about 2 m [5]. The cod-end can be detached from the wings, and cod-end mesh size is determined by fishers to suit the target species. About 20% of beach seines of Sri Lanka are operated off the north-western coast of Sri Lanka. The

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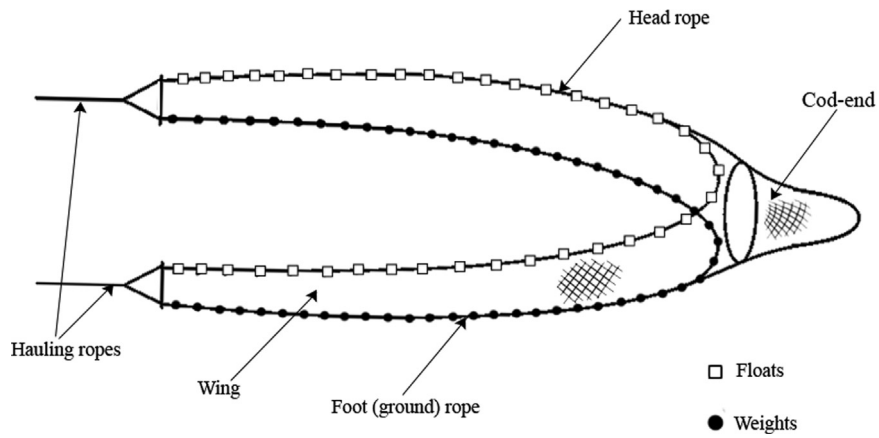


Fig. 1. Structure of a typical beach seine in Sri Lanka.

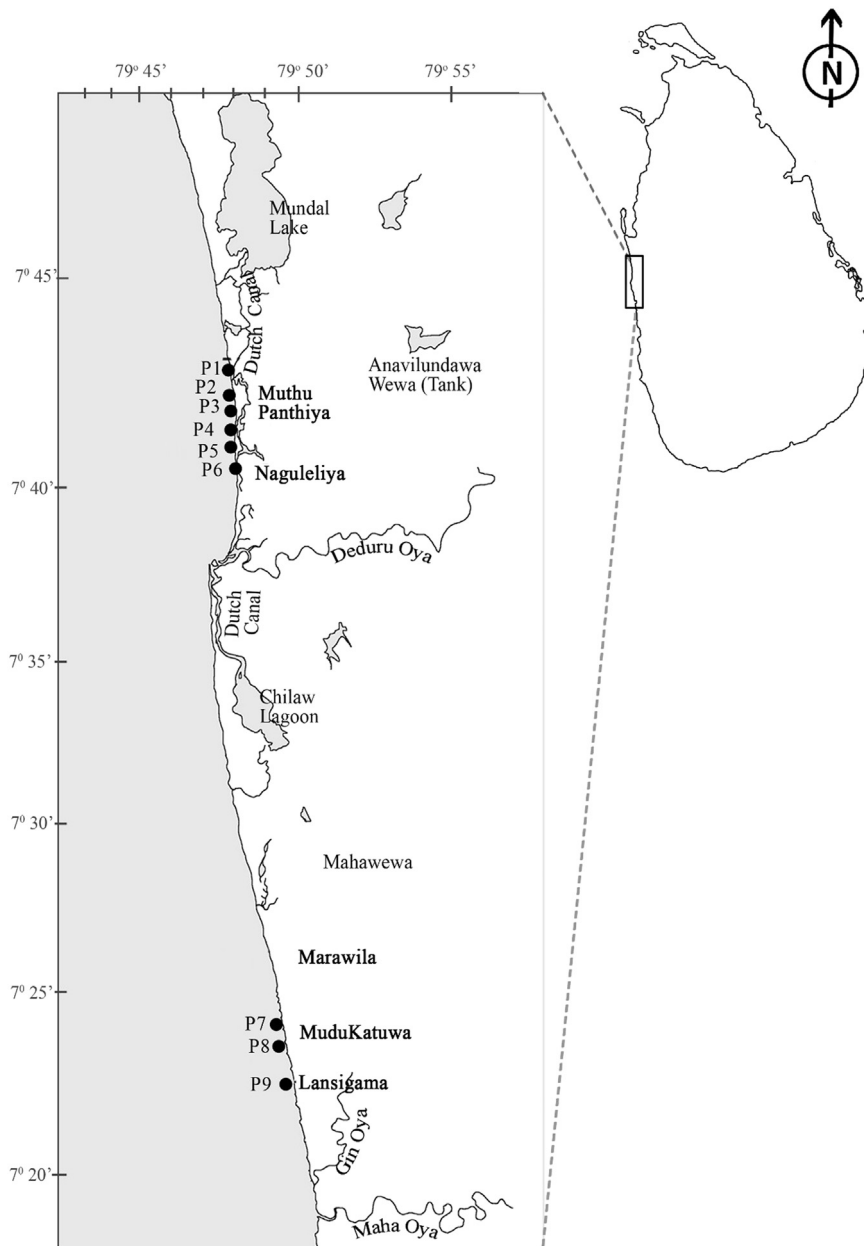


Fig. 2. Locations of the selected beach seine sites in the study area. Geo-positioning coordinates of sites are given in Table 2. Modified after Gunawardena and Amarasinghe [7].

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