MSc Degree in Environmental Science

ASSESSMENT OF DEBRIS POLLUTION IN SELECTED BEACHES OF JAFFNA DISTRICT

A dissertation submitted

by

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to

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ABSTRACT

Beach debris covers the natural material as well as the man-made material that accumulates on the shorelines; they accumulate from land based and marine based sources and they increase the threat of plastic based items along the coastal areas of Sri Lanka. There are beaches with debris pollution which makes the beaches unhealthy appearances and the impacts of beach debris harm to marine life and habitat degradation also discourage the arrival of tourists and other beach activities which areas are mostly disturbed by anthropogenic activities and beach debris negatively impacts the tourism and that may affect the economy of the country. The present study aimed to investigate the marine debris accumulation on the selected beaches of Jaffna coastal area of Sri Lanka. The study investigated the marine debris on the selected beaches of Jaffna district, and the belt transact method was used for collecting samples from each beach Casuarina, Chaddy, Kankesanthurai, Thumpalai, and Thalayadi and sampling was done from January to April. Three tides; high mid and low, were taken for the debris collection with each beach and had transact line with the area of $15m^2$. Then collected debris were categorized under House hold waste, Fisheries waste, Medical waste, Industrial waste and other type of waste. Those types of wastes were also classified by the material type with plastic, glass, metal and other materials then the plastics were further categorized under polymer types. These types of plastics were again categorized under the color of the plastic item and the particle shapes of the plastic likewise fragments, filament, film, pellet and other shape of the plastic.

Results revealed the abundance of waste along the particular beaches; the highest concentration 9.76 items/m^2 of the marine debris were accounted from Thumpalai beach as well as the lowest marine debris concentration 0.4 items/m^2 of marine debris were accounted from Chaddy beach and the cleanest beach was identified as Chaddy beach with mostly free from the plastic waste. The clean cost of the chaddy beach accounted as 8 items/m^2. The Clean Cost Index of Thumpalai Beach accounts for 195 items/m^2 and that is the highest Clean Cost Index among other beaches. The highest concentration of 1.89 items/m^2 Nylon polymer type of plastics was found on the Thumpalai beach. Over all the debris were highly accumulated at the high tide of all in the beaches. The least amount of PVC polymer type of plastics was accounted from all beaches. And also the monsoon variation made the changes of plastic accumulation at

the beaches. As there were plastic wastes found highly among the beaches around 90 percentages; authorities should bring strict regulation, in order to reduce plastic production as well as introducing alternative use of using plastics excessively. Except from Chaddy beach, the Clean Cost of Index of other beaches values are ranging from 56 to 195, therefore which beaches are classified extremely dirty beaches.

The findings emphasize the urgent need to ensure sustainable use of marine and coastal environments. The identification of beach debris along the beach areas further highlights the importance of collective action by the policy makers, local communities, and the responsible authorities to protect coastal ecosystem and to promote eco-tourism.

Key words: Jaffna Peninsula, Beaches, Marine debris, Coastal areas, Macro plastic.