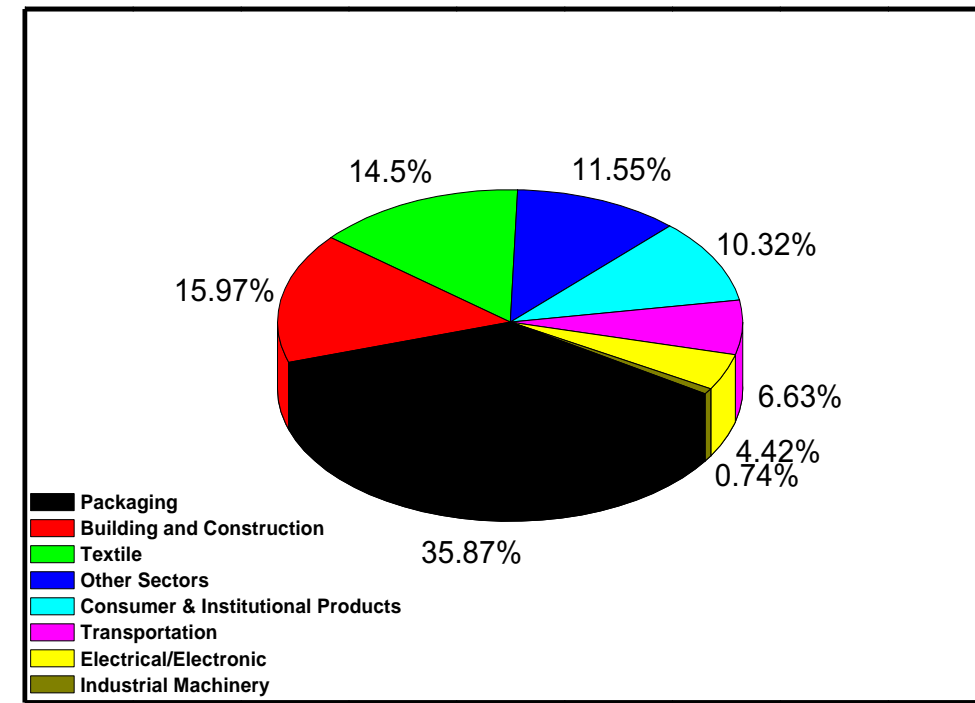


Introduction

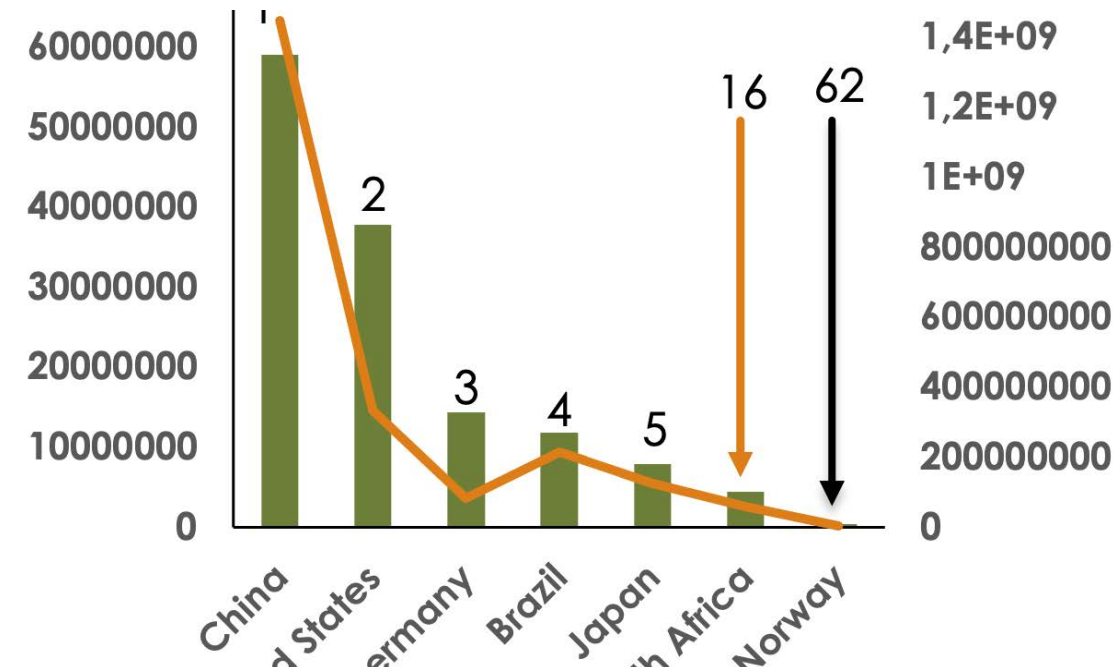
- **Packaging** accounts for >**35%** of plastic pollution, comprising more of SUP (single use plastics)

- **Building and construction** was the second largest sector utilizing **16%** of the total



Primary Plastic Utilization by Industrial Sectors

- Around **32 million** tons/year of coastal plastic waste are due to mismanagement
- Of the above, **8 million** tons/year find their way to the sea
- About **90%** of the ocean plastic **originates from the land** attributed to human activities
- China leads with plastic pollution followed by US. South Africa produces more plastic waste than Norway.



Problem Statement



Aim and Objectives

This study aims to examine the effectiveness of litterboom in trapping plastic pollution

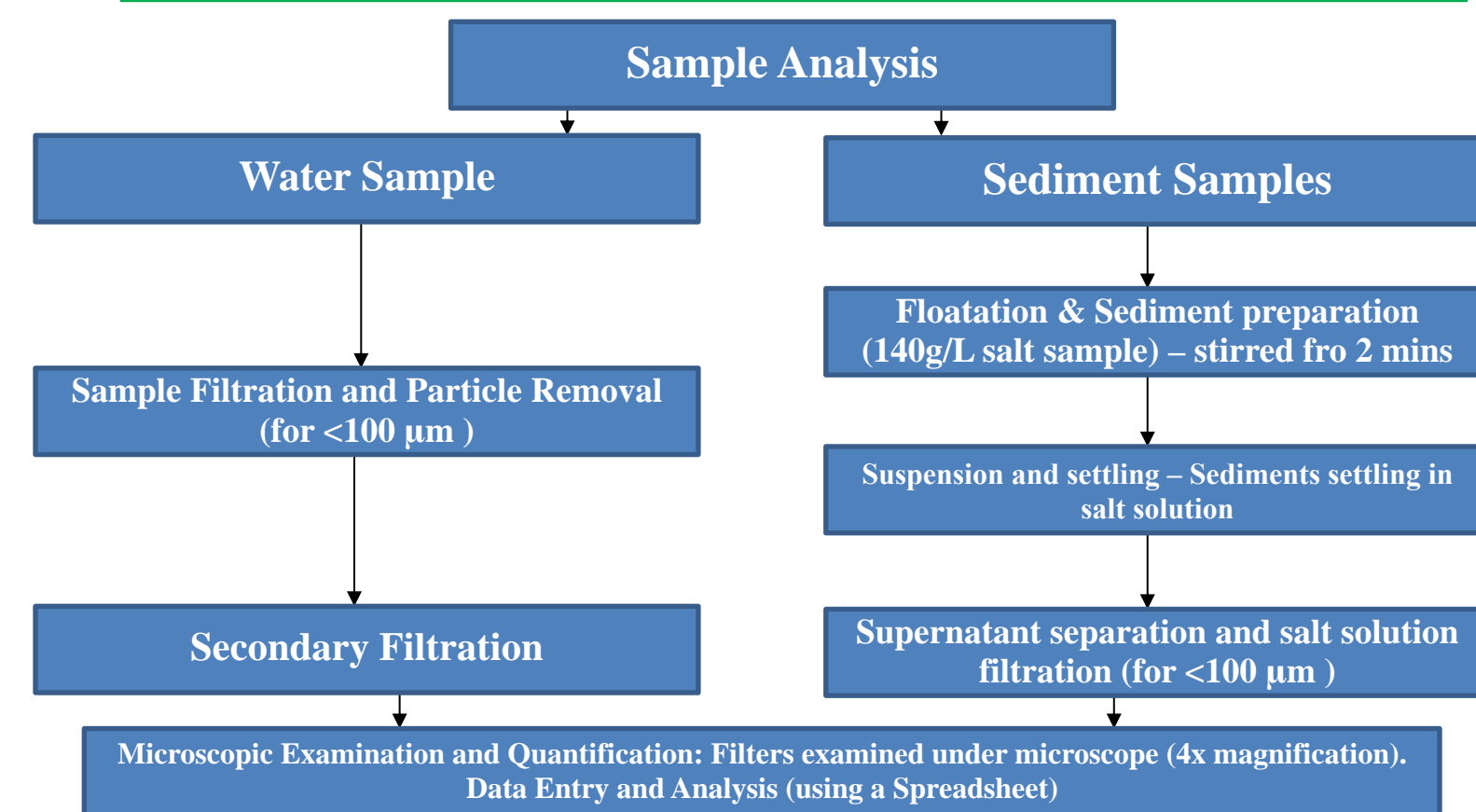
With the following specific objectives

- To assess the abundance of microplastic (MP) in the water and sediment upstream and downstream, of blue lagoon litterboom
- To study the impact of blue lagoon litterboom on the abundance of MPs.
- To propose a practical measures to improve the effectiveness of the blue lagoon litterboom and plastic waste management

Methodology

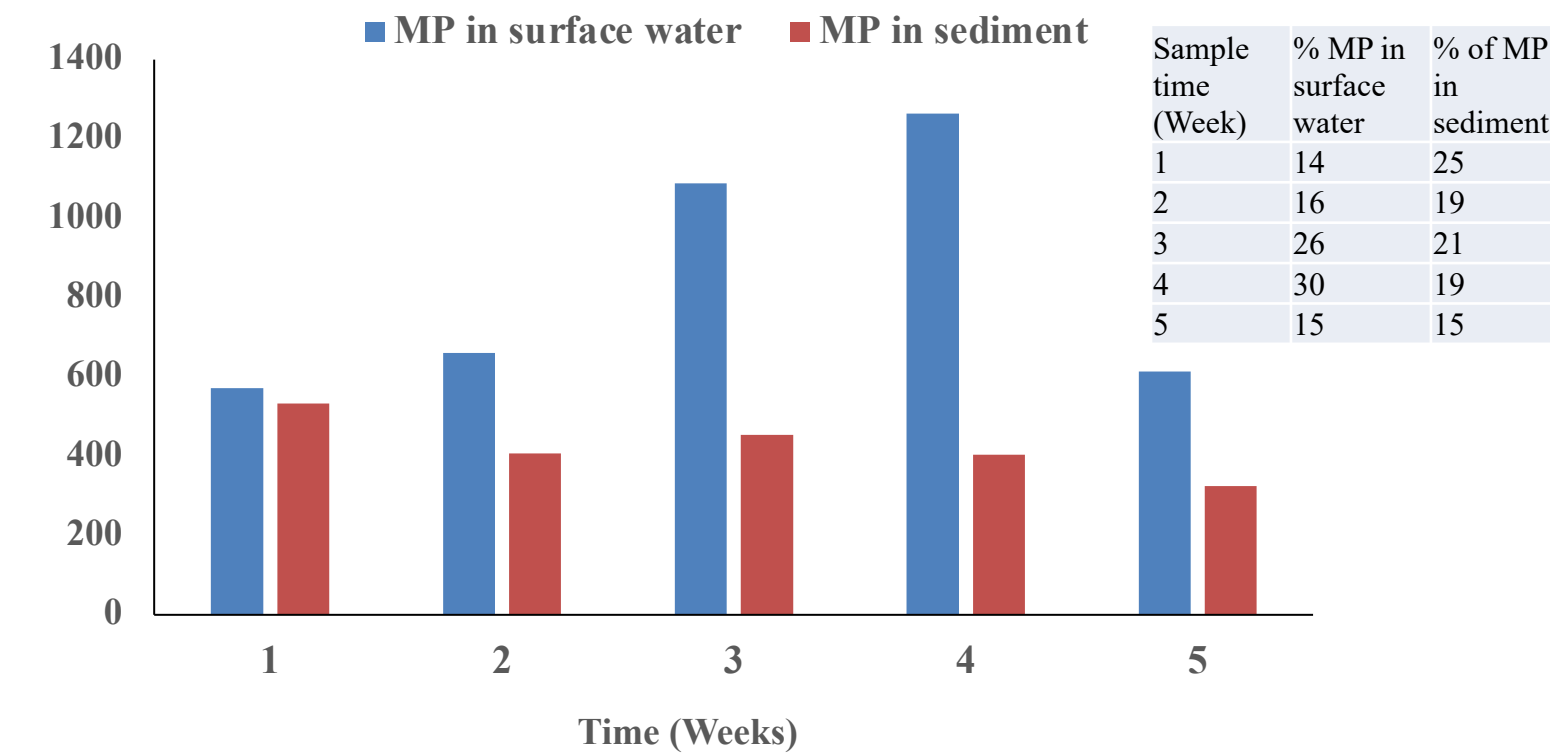
- **Objective 1:** *to determine the quantities of MP:* 3 sediment and water samples (near bank, mid-stream and far bank) were taken on weekly basis for 3 months. Water and sediment samples were collected in litre and 350 mL glass bottles respectively.
- **Objective 2:** *to determine litterboom effectiveness in capturing MP:* 20 sediments and 20 water samples collected at litterboom, 5m and 10m upstream and 5, 10 and 20m downstream. Sediments collected using a corer and stored in plastic and water samples stored in glass jars

Sample Analysis

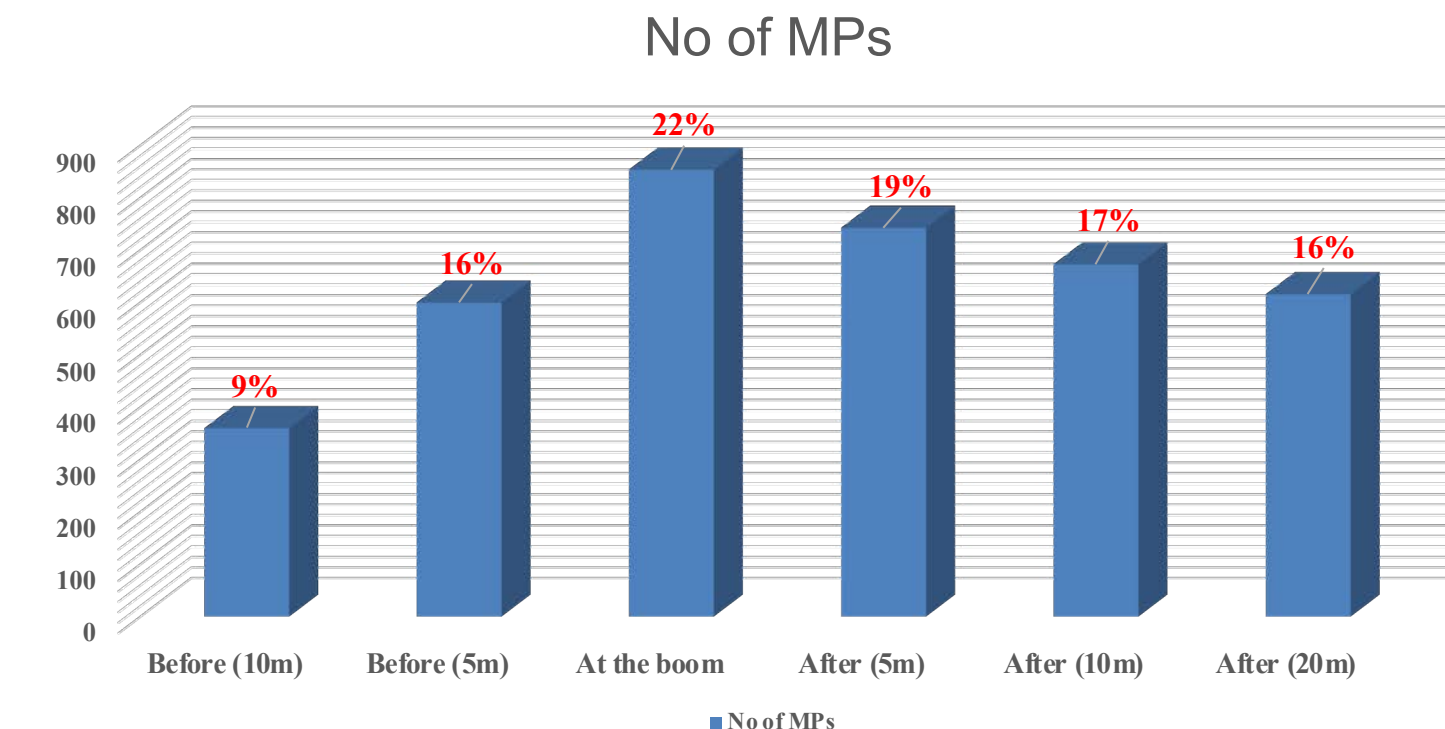


Results and Discussion

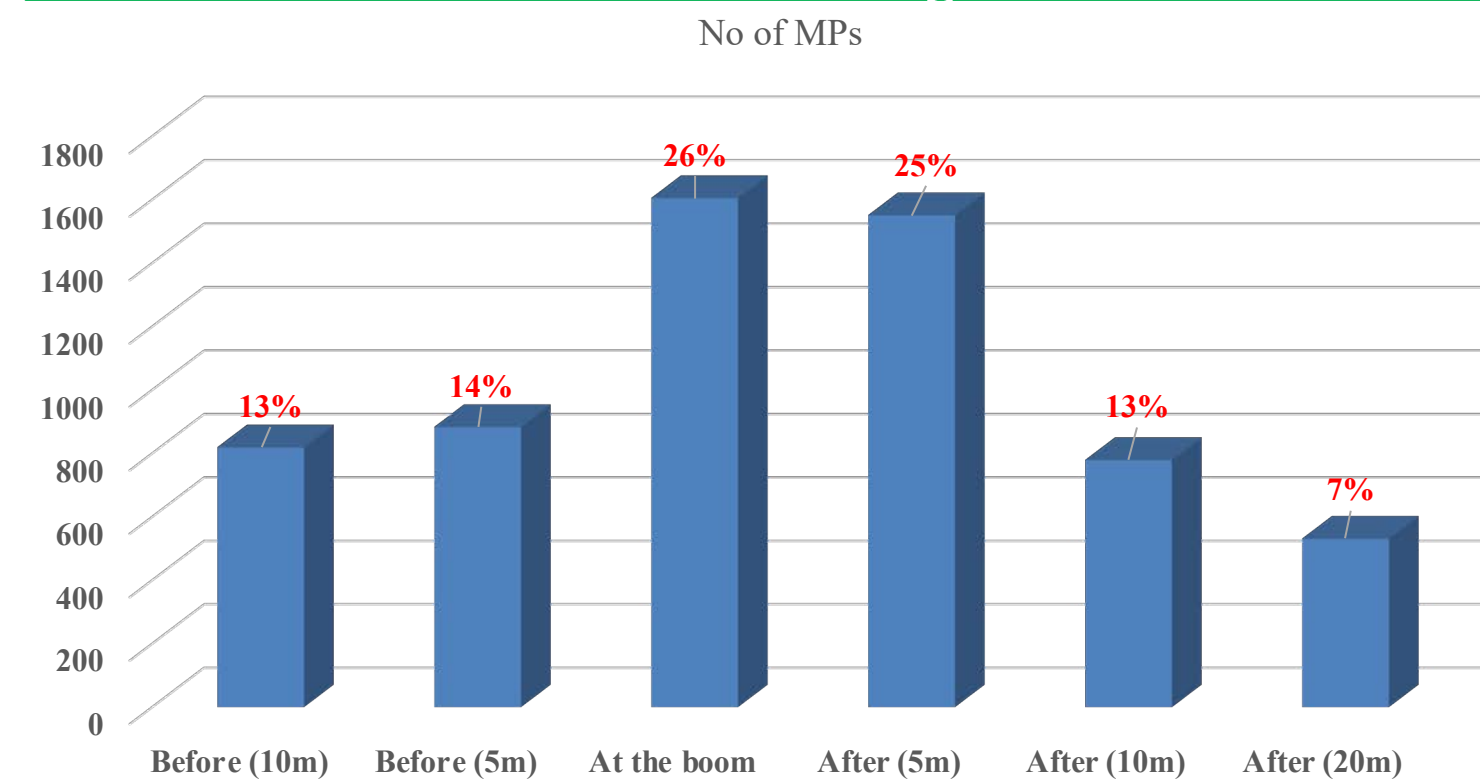
Total weekly accumulation of MP in Surface water and Sediments in Blue Lagoon Litterboom



MP abundance in SURFACE WATER at different distances from the Blue Lagoon Litterboom



MP abundance in the SEDIMENT at different distances from the Blue Lagoon Litterboom



Proposed Model to Improve Litterboom Effectiveness

The following Model has been proposed:

- Develop a machine learning model to predict ocean plastic movement, assisting in targeted litterboom deployment.
- Employ reinforcement learning to create an adaptable trapping algorithm, responding to real-time microplastic concentration and movement.
- Integrate sensors and IoT devices for optimal positioning and tension of the trapping system to enhance plastic collection.
- Establish a feedback loop for the system to learn and improve its trapping efficiency based on performance over time.

Conclusion

- Abundance of plankton-sized MPs in rivers threatens aquatic species and local communities.
- Understanding the type and size of marine plastic litter (such as MP) aids in developing effective pollution prevention techniques
- Abundance of low-density film particles in sediment suggests factors beyond density affect MP presence in marine habitats.
- Litterbooms may not capture MPs, but they concentrate MPs in sediment and surface water both upstream and downstream.
- Proposed model will enhance the effectiveness of litterboom while minimizing plastic waste concentration in the marine ecosystem
- Emphasizing the need for continued research to better understand, mitigate MP pollution's impacts on ecosystems and health.

Acknowledgment

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Reference

Kaplan, S. (2016). By 2050, there will be more plastic than fish in the world's oceans, study says. *The Washington Post*, 20.