ASSESSMENT OF SINGLE-USE PLASTIC (SUP) WASTE MANAGEMENT CAPACITY IN SUNDARBANS TRANSBOUNDARY REGION

PRISTINE PROJECT

ESDO

Arannayk foundation

Report on

Assessment of Single-Use Plastic (SUP) Waste Management Capacity in Sundarbans Transboundary Region

Plastic Reduction Initiative in Sundarbans Transboundary International Natural Ecosystems (PRISTINE) Project

Under the
United Nations Office for Project Services (UNOPS)

Site 1: Mongla Bazaar and Embankment area

Site 2: Sundarbans Reserved Forest

Conducted by

ENVIRONMENT AND SOCIAL DEVELOPMENT ORGANIZATION- ESDO

In Collaboration with

ARANNAYK FOUNDATION (AF)

Executive Summary

This report presents a comprehensive assessment of plastic waste inventory and hotspot identification in Mongla and Koromjol. Conducted under the PRISTINE Project, this study aims to understand the sources, sinks, and frequency of plastic pollution in unmanaged waste dumping areas. By mapping plastic waste accumulation trends, categorizing waste types, and evaluating existing waste management infrastructure, this assessment provides targeted recommendations for improved waste management and policy interventions.

Key Findings

A total of 10,161 plastic items weighing 80.49 kg were collected from 20 locations in Mongla, with PET bottles and polypropylene packaging being the most common waste types. Multi-layer plastics constituted 89% of the total waste, making recycling a challenge. The highest accumulation hotspots were identified in Perikhali, Kumarkhali, and Mongla Sadar using GIS mapping.

At the Koromjol eco-tourism site, 1,911 plastic items were found, totaling 18.13 kg, with 64% of the waste unmanaged. Key sources included beverage bottles, food packaging, and polythene bags, with major contributors being Coca-Cola, PepsiCo, PRAN-RFL, and Meghna Group. Overflowing bins and insufficient collection infrastructure exacerbated the issue.

Recommendations

For Mongla Markets and Riverbanks:

- **Prioritize interventions in high-risk markets** (Perikhali, Kumarkhali, Badiyamari) through structured waste management initiatives.
- **Engage local stakeholders** (market committees, traders, and waste collectors) to implement plastic waste segregation and collection systems.
- **Use GIS mapping** to continuously track plastic waste hotspots and guide policy actions.
- **Strengthen enforcement** of plastic waste management regulations and promote eco-friendly packaging alternatives.

For Koromjol Eco-Tourism Site:

- **Expand waste bin availability** and ensure regular collection services.
- **Implement color-coded waste segregation** to facilitate recycling.
- **Conduct eco-awareness programs** targeting tourists, vendors, and local authorities.
- **Hold corporations accountable** through Extended Producer Responsibility (EPR) initiatives.
- **Develop sustainable tourism policies** that integrate plastic waste reduction measures.

By implementing these recommendations, Mongla and Koromjol can significantly reduce plastic pollution, safeguard biodiversity, and promote sustainable waste management in the Sundarbans region.

Introduction

Plastic pollution is a growing concern in ecologically sensitive areas like the Sundarbans transboundary region. This report presents the findings from assessments conducted at two key sites, **Site 1: Mongla** and **Site 2: Sundarbans Reserved Forest (SRF)**, to evaluate the consumption, waste management, and environmental impact of single-use plastics (SUPs). The study aims to identify key challenges and propose solutions for reducing plastic pollution in these critical areas.

Objectives

- To assess the extent of SUP usage and disposal practices in both study sites.
- To evaluate the effectiveness of existing waste management systems.
- To identify stakeholder perceptions and involvement in plastic waste management.
- To propose actionable recommendations for SUP reduction and improved waste management.

Audit Methodology

The waste audit employed a structured methodological approach to ensure accurate data collection and analysis:

Sampling Sites: Plastic waste samples were collected from markets, riverbanks, tourist pathways, vendor stalls, and unmanaged dumping areas.

Data Collection: Waste samples were collected from multiple locations, including designated bins, tourist pathways, vendor stalls, and open areas. The total area coverage of the Koromjol site was approximately 30 hectares, with audit sampling covering approximately 10 hectares where waste accumulation was significant.

Waste Categorization: Collected waste was categorized by material type (PET, PP, LDPE, PS, etc.) and by brand identification.

Waste Quantification: The total weight and volume of plastic waste were measured, with comparisons made between managed and unmanaged waste streams.

Stakeholder Analysis: To understand tourists', shopkeepers', and site authorities' waste disposal behaviors, observers and informal interviews were conducted.

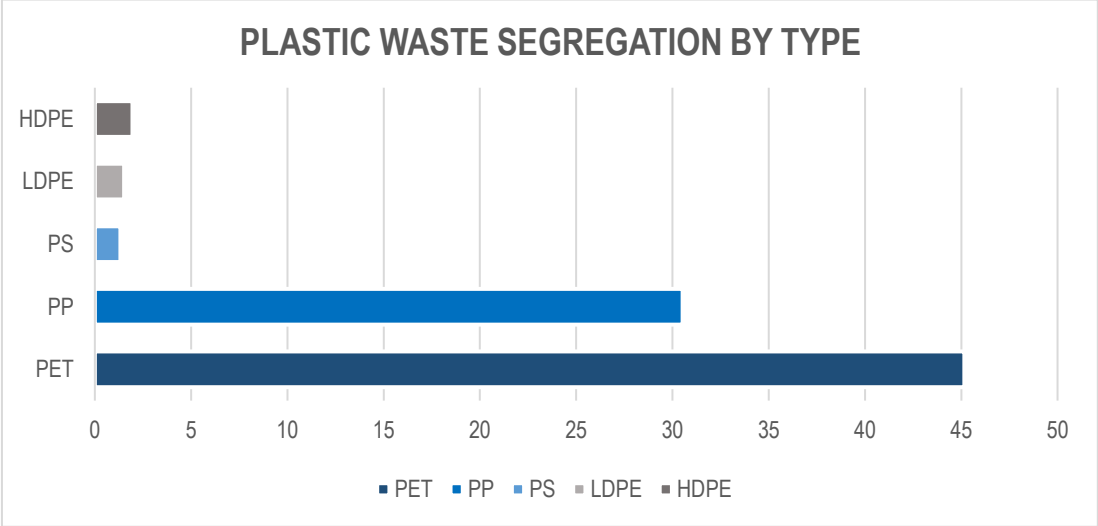
Data Interpretation and Trend Analysis: Findings were analyzed to identify patterns and key factors contributing to waste accumulation.

Findings and Analysis

Findings from Site 1: Mongla Markets and Riverbanks

Plastic Waste Quantification

- **Total Collected:** 10,161 plastic items from 20 sites, weighing **80.49 kg**.
- **Waste Density: 5.27 kg per acre**.
- **Major Plastic Types:** PET bottles (Coke, Sprite, Mojo), PP packets (biscuit wrappers, chips packets), PS bottle caps, LDPE cigarette wrappers, and HDPE polythene bags.
- **Key Findings:** PET (45.16 kg) and PP (30.53 kg) dominated, with multi-layer plastics making up **89% of the waste**, highlighting recycling challenges.



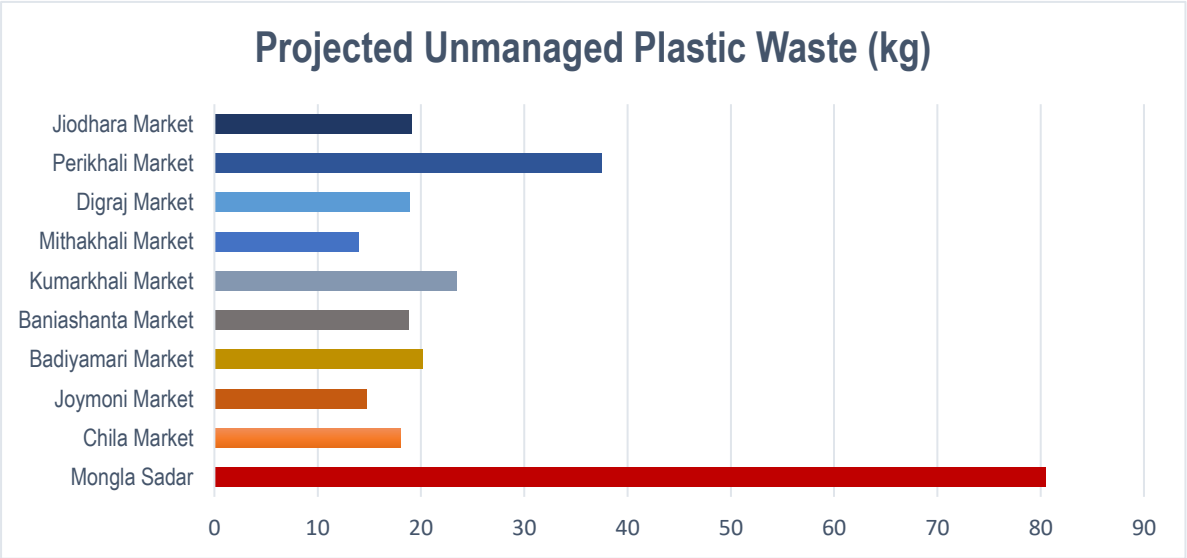
Plastic Consumption and Waste Streams

- **Consumption Categories:** Single-use plastics (sachets, plastic bags, disposable cutlery), packaging waste, hard plastics (containers, buckets), and fishing gear.
- **Waste Stream Analysis:**
    - **Recyclables:** PET bottles, and hard plastics, collected by informal waste pickers.
    - **Unmanaged Waste:** Disposed of in open spaces, drains, and water bodies.
    - **Burned Waste:** Some plastics are burned, contributing to air pollution.
    - **Mismanaged Market Waste:** Mixed with organic waste at unmanaged sites.

Projected Waste Accumulation in Other Markets

Using **5.27 kg/acre** as a baseline, projected unmanaged plastic waste for nearby markets includes:

- **Perikhali Market:** 37.53 kg (largest contributor due to market size).
- **Kumarkhali Market:** 23.51 kg.
- **Mithakhali Market:** 13.97 kg (lowest accumulation).
- **Joymoni Market:** 14.76 kg.



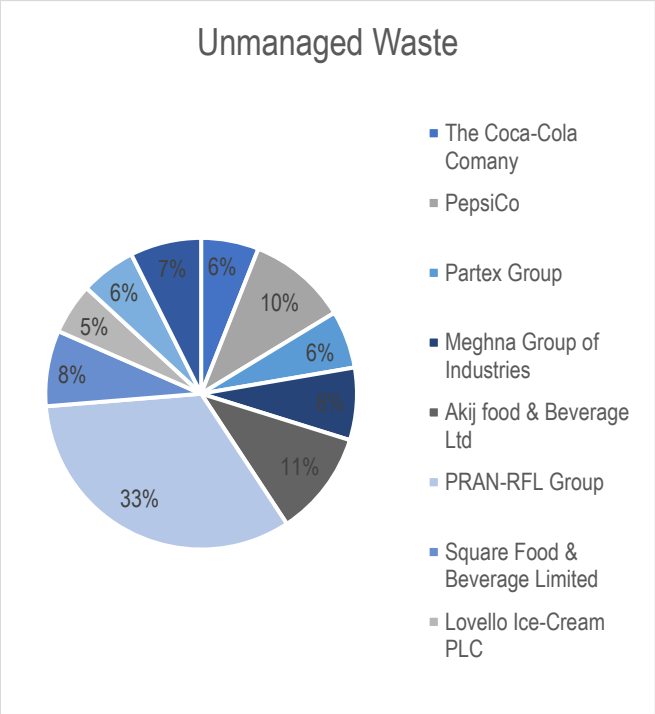
Environmental Impact

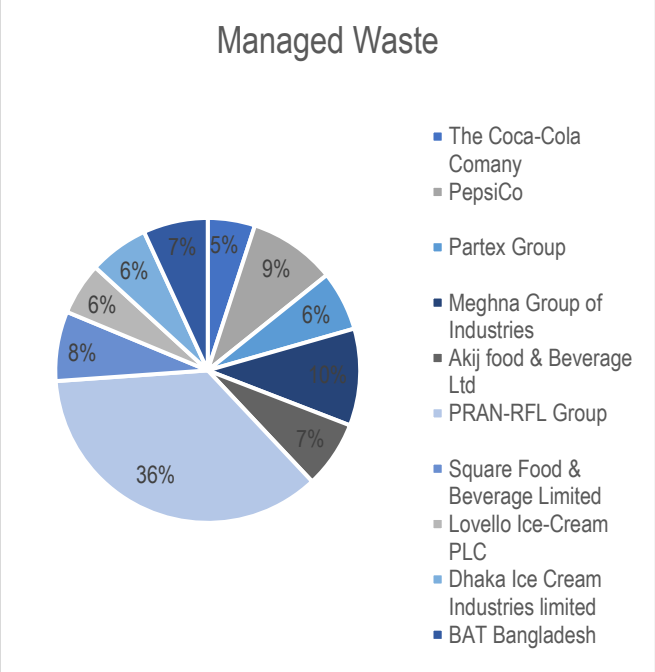
- Notable accumulation of plastic waste along **riverbanks and mangrove areas**, affecting marine biodiversity.
- **Microplastic contamination risk** due to continuous plastic degradation in the Pasur River.
- Increased **entanglement and ingestion of plastics** observed in aquatic species.

Stakeholder Perspectives

- Local business owners acknowledge SUP pollution but emphasize **the lack of alternatives** and awareness.
- Waste workers and recyclers highlight **low market value for certain plastic waste types**, limiting recycling.
- Conservation groups stress the **urgent need for regulatory enforcement** against plastic dumping.

Findings from Site 2: Koromjol Eco-Tourism Site





Plastic Waste Quantification

- **Total Collected:** 1,911 plastic items, weighing **18.13 kg**.
- **Unmanaged Waste: 64%** found scattered across tourist paths and vendor areas.
- **Key Plastic Types:** PP (food packaging, wrappers), PET (beverage bottles), and LDPE (plastic bags).
- **Major Contributors:** PRAN-RFL, Partex Group, Coca-Cola, PepsiCo.

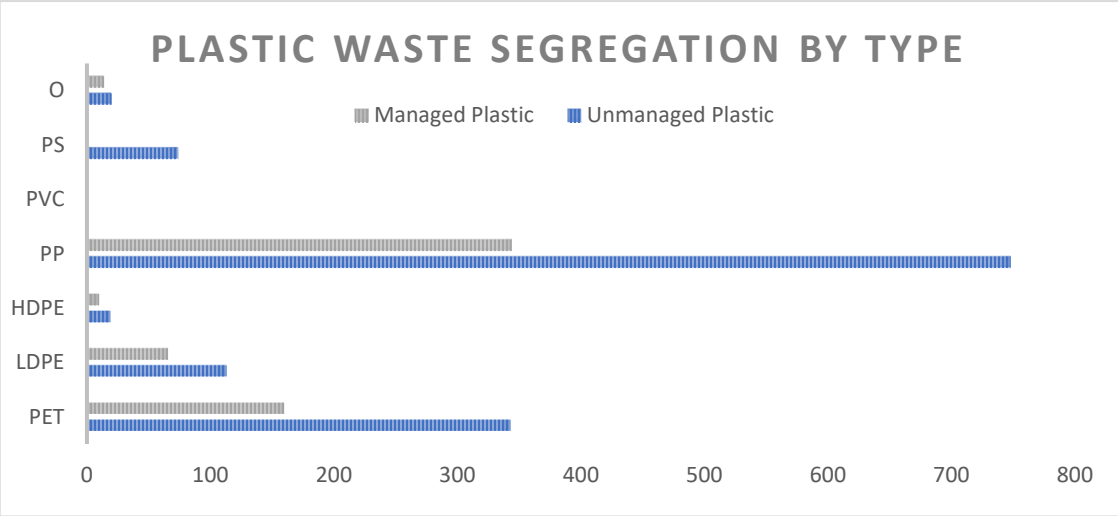
Waste Distribution and Management

- **Primary Sources:** Tourists (improper disposal of food and beverage packaging), vendors (plastic wrapping and packaging materials), and limited local authority intervention.
- **Waste Segregation:** PP and PET plastics dominated the unmanaged waste, primarily from snack wrappers, beverage bottles, and plastic bags.
- **Infrastructure Issues:** Overflowing bins, lack of waste segregation, and inadequate collection services.

Unmanaged Waste Hotspots

- **High-accumulation zones:** Tourist resting areas, picnic spots, vendor stalls, and near water bodies.

- **Infrastructure Issues:** Overflowing bins, lack of proper segregation, and inadequate waste collection services.



Environmental Impact

- **Plastic debris accumulating in mangrove roots**, affecting soil and water quality.
- **Ingestion of plastics by wildlife**, especially deer, dolphins, and birds, reported by conservationists.
- **Floating plastic waste transported by tidal currents** contributes to transboundary pollution.

Stakeholder Perspectives

- **Forest officials** report challenges in enforcement due to vast and remote areas.
- **Tour operators and local businesses** support restrictions on plastics but require **eco-friendly alternatives**.
- **Fishermen express concern** over plastic entanglement affecting fish stocks and navigation.

Projected Waste Accumulation Trends

- **Mongla markets could generate up to 200 kg of unmanaged plastic waste per month** if no intervention is made.
- **Koromjol's unmanaged waste levels could rise by 30% annually** due to increased tourist activity.

Challenges and Recommendations

Key Challenges in Mongla and Koromjol

1. **Limited Awareness and Behavioral Issues:** Many tourists, vendors, and market stakeholders are unaware of proper waste disposal methods, leading to excessive littering and mismanagement.
2. **Insufficient Waste Collection Infrastructure:** Inadequate bin availability and irregular collection result in unmanaged waste piling up, particularly in high-traffic areas.
3. **Lack of Recycling Facilities:** Both sites lack structured recycling systems to process plastic waste efficiently, contributing to increased landfill waste.
4. **Environmental and Logistical Constraints:** The humid, tidal, and forested nature of Koromjol, combined with high commercial activity in Mongla, poses significant challenges to waste collection and management.

Challenges	Site 1: Mongla	Site 2: SRF
High plastic waste generation	Yes	Seasonal
Lack of proper waste management	Yes	Yes
River dumping of plastics	High	Moderate (tidal flow)
Tourism-related plastic pollution	High	High
Stakeholder willingness to reduce plastics	Moderate	High
Enforcement challenges	Moderate	High (due to remoteness)

Recommendations for Plastic Waste Management

1. Community Engagement and Stakeholder Involvement

- Establish community-led waste collection programs in high-waste zones, engaging local market committees, vendors, and waste pickers.

- Introduce vendor-led waste collection programs in Koromjol, offering incentives for plastic return and recycling initiatives.
- Collaborate with local authorities, NGOs, and businesses to implement Extended Producer Responsibility (EPR) programs, ensuring corporate accountability in waste management.

2. Waste Reduction and Management Initiatives

- Implement plastic waste segregation systems at market sites and tourism hotspots.
- Expand waste bin availability in high-traffic areas, ensuring regular collection services to prevent litter accumulation.
- Develop recycling and reuse programs to process collected waste and minimize landfill dependency.

3. Infrastructure & Policy Enhancements

- Develop a GIS-based hotspot map to visualize plastic waste accumulation and guide targeted interventions.
- Strengthen policy enforcement to regulate plastic waste disposal and promote alternative eco-friendly materials.
- Introduce color-coded waste segregation systems to enhance recycling efficiency and proper disposal at both sites.

4. Awareness & Behavioral Change Initiatives

- Conduct eco-awareness campaigns targeting tourists, vendors, and local authorities to promote responsible waste disposal.
- Enforce restrictions on single-use plastics (SUPs) such as plastic bags, polythene wrappers, and disposable food packaging.
- Promote alternatives like refillable water bottles, cloth bags, and biodegradable packaging materials.

By implementing these recommendations, Mongla and Koromjol can significantly reduce plastic pollution, enhance community engagement in waste management, and develop a sustainable approach to conserving the Sundarbans region.

Conclusion and Next Steps

This study provided a detailed analysis of the accumulation patterns of single-use plastics (SUP) and the associated behavioral trends related to plastic disposal. The findings underscore the pressing requirement for enhanced waste management infrastructure, more stringent regulatory enforcement, and increased collaboration among stakeholders to effectively address the escalating environmental challenges posed by plastic pollution in the Sundarbans Transboundary Ecosystem.

Proposed Next Steps

1. Launch pilot waste segregation and collection programs in Mongla's high-risk markets.
2. Develop an incentive-based plastic return system for vendors and tourists in Koromjol.
3. Enhance policy frameworks through stricter enforcement of plastic waste regulations.
4. Expand the use of GIS mapping to monitor plastic pollution trends over time.

By implementing these strategies, Mongla and Koromjol can become models for sustainable plastic waste management, contributing to a cleaner environment and the long-term conservation of the Sundarbans.