Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

based on a decision of the German Bundestag

PROTEGO

Prevention of Marine Litter in the Gulf of Guinea

Nigeria

(Output Paper)

Report - Beach Sampling and Characterization in Ajegunle, Lagos, Nigeria

April 2025

Imprint

Suggested citation: PROTEGO (2025): Report - Beach Sampling and Characterization in Ajegunle, Lagos, Nigeria

The project team expresses its gratitude to all the participants for a very valuable and highly appreciated contribution.
Photo credits: Project PROTEGO
Project Website: www.projectprotego.org
Email: facco@adelphi.de

Project Contribution to SDGs:

8 DECENT WORK AND ECONOMIC GROWTH

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

17 PARTNERSHIPS FOR THE GOALS

Disclaimer: This paper has been produced with the financial support of the German Federal Ministry for the Environment in the framework of the ‘Prevention of Marine Litter in the Gulf of Guinea (PROTEGO Project)’. Its contents are the sole responsibility of the authors and do not necessarily reflect the views of the German Federal Ministry for the Environment.

Table of Contents

List of Figures

List of Tables

1. Overview of activities

The Prevention of Marine Litter in the Gulf of Guinea (PROTEGO) project aims to address plastic pollution in West Africa by identifying key leakage points and promoting circular economy solutions through field-based diagnostics and community-inclusive strategies. This report presents findings from a field-based waste sampling activity undertaken along the banks of the Apapa and Tolu Canals in Ajegunle, Lagos, both of which are directly adjacent to the Tin-Can Island Port and ultimately discharge into the Atlantic Ocean. The aim is to support evidence-based solutions that reduce the inflow of waste into Nigeria's waterways and coastal systems.

This beach sampling study, conducted as part of PROTEGO's Work Package 1, was carried out on March 20th and 21st, 2025, during low tide and under sunny weather conditions. Two key locations were selected for the sampling exercise: the south side of the Apapa Canal (6.43645 N, 3.34749 E) and the east side of the Tolu Canal (6.43809 N, 3.34872 E). The activity took place from 12:47 p.m. to 1:35 p.m. at Apapa, and from 1:09 p.m. to 1:47 p.m. at Tolu. A satellite image of the Apapa and Tolu Canals, showing the designated sampling sites, is presented in Figure 1 below.

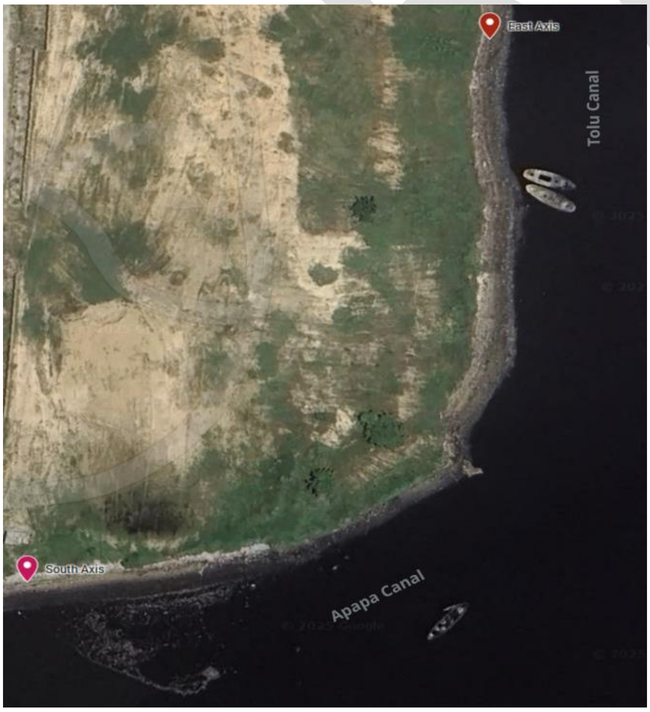

Figure 1: Satellite Images of Apapa Canal and Tolu Canal in Ajegunle, Lagos

This assessment was carried out by a multi-stakeholder team representing public, private, and community-based organizations. The collaborative nature of the activity enhanced local engagement and contextual understanding of waste challenges in the Ajegunle area.

Table 1: Field Team Members and Affiliations

Name	Organization
Clem Ugorji	PROTEGO Regional Coordinator
Victor Andrew Eyo	WASTE Africa (PROTEGO partner)
Juliet Odhikori	WASTE Africa (PROTEGO partner)
Arike Jinadu	NCIC (PROTEGO partner)
Tosin Ajide	NCIC (PROTEGO partner)
Lanre Shashore	Lagos Waste Management Authority (LAWMA)
Orobaba Oludayo Abayomi	Ajeromi Ifelodun L.G.A
Bolanle Oluwa	Circularity Africa Limited
Egbowon Eyitioluwa	Circularity Africa Limited
Seunfunmi Ogunbure	Circularity Africa Limited
Adebisi Elizabeth	Volunteer
Mustabin Oluwa	Tolu Community

Sampling Objective

The objective of this activity is to conduct beach sampling to assess the waste present along the banks of the Apapa and Tolu Canals in Ajegunle, both of which are adjacent to the Tin-Can Island Port in Lagos, Nigeria. The collected waste was characterized to determine the types, composition, and quantity of waste generated. The analysis provides insight into the predominant waste generated in the locality to allow PROTEGO to develop solutions that effectively manage the waste to prevent environmental pollution and reduce waste leakage into the marine environment

2. Methodology

The beach sampling methodology involved selecting representative sections of the Apapa and Tolu Canal banks based on visible waste accumulation and local waste disposal behaviors. A transect of 20 meters in length, spanning the width of the beach from the waterline to the start of vegetation, was demarcated to standardize the sampling area. All visible waste within each transect was collected, excluding bulky or organic materials, to ensure comparability across sites.

Following collection, waste materials were transported to a designated characterization area, where they were sorted by category, counted, and weighed. This approach allows for a detailed quantitative and qualitative analysis of the waste streams impacting the Ajegunle canal system.

3. Waste Sampling

Sampling was conducted (using the beach sampling methodology developed as part of PROTEGO) within a 20m x 5m transect on one side of the Apapa canal and the Tolu canal on the tagged “South-Side” and “East-Side” axes respectively. There was visible litter on the canal bank surface, some of which were embedded in the soil, and floating in the water. The waste along the banks of both canals were not fresh and appeared to have washed up with the waves and not been dumped there by the community.

The team collected waste for approximately 50 minutes at each site, after which sampling was concluded based on the assessment that the collected materials were sufficiently representative of the area’s pollution. Although not all visible waste could be retrieved during this session, the transects were thoroughly cleaned to ease of future monitoring at the same locations.

After collection, the waste was transported to the Circularity Africa Ltd. facility, which provided the space necessary for the subsequent waste characterization process.

Figure 2: Sampling Transect demarcation at Apapa Canal (South Side Axis), Ajegunle

Figure 3: Waste transect during cleaning at Tolu Canal (East Side Axis)

Figure 4: Waste transect at the end of the sampling and cleaning at Tolu Canal (East Side Axis)

Figures 2, 3 and 4 above show the sampling transect demarcation at the Apapa Canal (South Side Axis) and the waste transect before and after sampling and cleaning at the Tolu Canal (East Side Axis), respectively. The various waste types found within the transects established on both canal banks were sampled over a period of 48 minutes on the South-side axis and 38 minutes on the East-side axis to ensure a comprehensive representation of the available waste materials. The collected waste from both transects was separately bagged and tagged for further analysis.

4. Waste Characterization

The waste collected from each transect was placed on a table and categorised by type. Subsequently, the number of items in each group was counted and then weighed. Figure 4 shows the waste sorting and characterization activity by the PROTEGO team.

Figure 5: Waste Sorting and Characterization Activity

Figure 6: Sorted Plastic Cutlery and Food Packaging

Figure 7: Sponge and Foam Waste Fragments

Figure 8: Thin Plastic Films

Figure 9: Discarded Footwear

Figure 10: Assorted Bottle Caps and Small Plastics

Figure 11: Multilayered Sachets and Wrappers

4.1. Waste Characterization for the South Side Axis

Table 2: Characterization Data for the South Side Axis

Material	No.	Article	Quantity (n. items)		%	Weight (grams)		%
Plastic	1	Plastic fragments (hard)	2	357	42.8%	6	3,293	33.4%
	2	Beverage bottles	3			64		
	3	Bottle rings	9			6		
	4	Plastic bottle caps	64			119		
	5	General plastic caps	9			12		
	6	Pharmaceutical packaging, medicine and ointments (plastic)	2			7		
	7	Paste and cream tubes (plastic)	3			30		

	8	Plastic containers (including lid)	2			5		
	9	Disposable cutlery (plastic)	67			180		
	10	Disposable cups (plastic)	37			93		
	11	Plastic wrapping and packaging	14			103		
	12	Plastic bags	3			139		
	13	Clothespin	1			3		
	14	Ethylene vinyl acetate (EVA - foam)	26			296		
	15	Croc footwear	5			524		
	16	Other plastic bottles (droppers)	4			26		
	17	Multilaminate drink sachets	32			68		
	18	Water sachets	6			29		
	19	Drink labels	3			3		
	20	Polyurethane foam	65			1,580		
Styrofoam	21	Styrofoam packaging fragments (granulated or laminated)	93	407	48.7%	857	1,144	11.6%
	22	Fragments of food container (smooth styrofoam)	300			247		
	23	Disposable plates (styrofoam)	14			40		
Textiles	24	Clothing	6	12	1.4%	2,188	3,138	31.8%
	25	Shoes and sandals	4			179		
	26	Bags	2			771		
Glass and Ceramics	27	Whole glass bottles	2	6	0.7%	598	685	6.9%
	28	Pharmaceutical bottles, medicine and ointments (glass)	4			87		
Metals	29	Aluminum cans (beverages)	1	2	0.2%	20	20	0.2%
						0		
	30	Metal caps	1					
Rubber	31	Flip-flops	10	21	2.5%	724	983	10.0%
	32	Sole/Insoles	10			256		
	33	Comb	1			3		
Wood	34	Sticks	10	10	1.2%	402	402	4.1%
Others	35	Lighters	7	20	2.4%	54	205	2.1%
	36	Syringes and needles	1			4		
	37	Markers	4			52		
	38	Light bulb	1			20		
	39	Hair extension	1			19		
	40	Bubble wraps	2			16		
	41	Pallet strapping bands	4			40		
Total			**835**	**100%**	**9,870**	**100%**		

Table 2 presents the results of waste characterisation for the South Side Axis of Apapa Canal, derived from a total of 835 items weighing 9,870 grams. Styrofoam was the most prevalent material by quantity, making up 48.7% of the total items. This category primarily consisted of food container fragments and disposable plates. However, due to its lightweight nature, Styrofoam contributed only 11.6% of the total weight.

Textiles were the second-largest category by quantity, accounting for 31.8%, predominantly from discarded clothing and footwear. In contrast, plastic waste was a major contributor to the overall weight, making up 42.8%. The most common plastic items included disposable cutlery, cups, and packaging materials.

Rubber waste, primarily from footwear, accounted for 2.5% of the items and 10% of the weight, while glass and ceramics made up 0.7% of items and contributed 6.9% of the total weight.

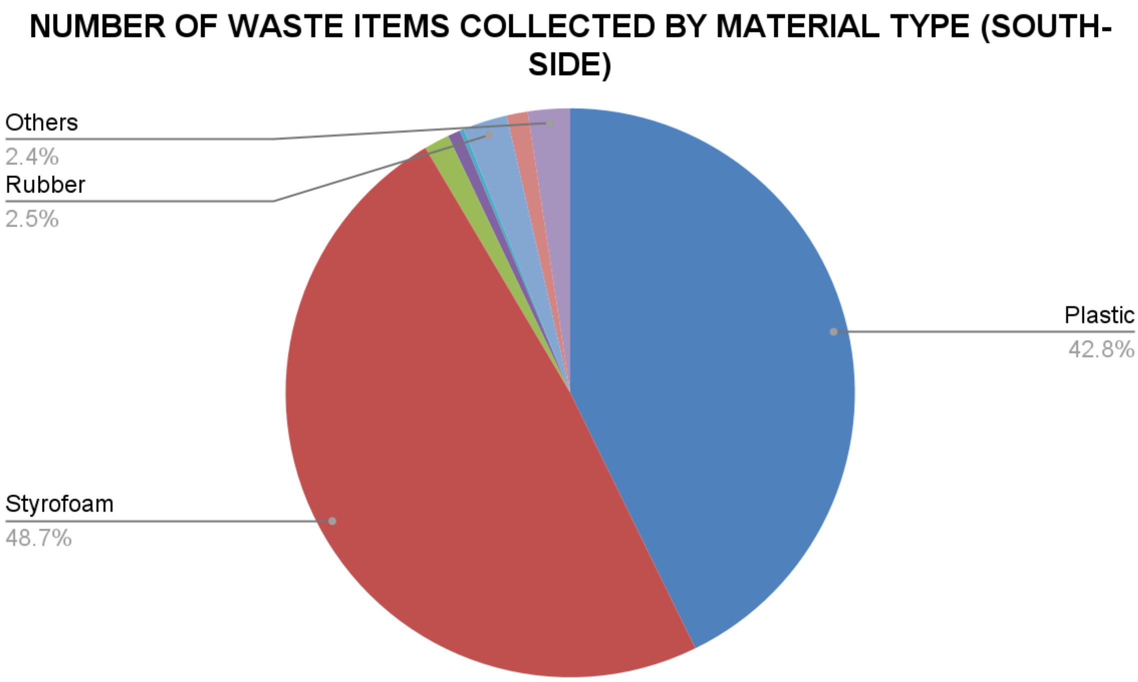

Figure 12: Waste quantification in South Side Beach

The chart in Figure 11 illustrates the quantity of waste collected along the South Side Axis, categorised by material type. Styrofoam and plastics together make up the vast majority of the waste, accounting for a cumulative 91.5% of the total items, while smaller contributions come from rubber (2.5%), textiles (1.4%), and other materials (2.4%).

4.2. Waste Characterization for the East Side Axis

Table 3 below provides the waste characterisation results for the East Side Axis, based on a total of 600 items weighing 21,589 grams. Plastics emerged as the most dominant material category by quantity, comprising 29.7% of the total items. Key contributors in this category included plastic wrapping as well as plastic bags. Plastics also accounted for 22.9% of the total weight, reflecting their significant presence in the waste stream.

Styrofoam was the second-largest material category by quantity, contributing 58% of the items. This primarily consisted of food container fragments, disposable plates, and packaging materials. Despite its prevalence, Styrofoam contributed only 2.2% of the total weight due to its lightweight properties.

Textiles, on the other hand, were the most significant contributor by weight, making up 59.7% of the total. This category included discarded clothing, shoes, and sandals, which are typically denser and heavier. Glass and ceramics were notable for their weight contribution as well, accounting for 5.9% of the total weight, despite representing only 0.3% of the items.

Other categories included rubber and miscellaneous items, such as medical waste and diapers. Rubber waste, primarily from flip-flops and footwear, accounted for 3.2% of the total weight. Miscellaneous items, though small in quantity, represented 3.8% of the total weight, underscoring the diversity of waste types present.

Table 3: Characterization Data for the East Side Axis

Material	No.	Article	Quantity (n. items)		%	Weight (grams)		%
Plastic	1	Beverage bottles	2	178	29.7%	38	4,950	22.9%
	2	Plastic bottle caps	4			8		
	3	Seasoning packages	3			2		
	4	Disposable cutlery (plastic)	2			6		
	5	Disposable cups (plastic)	3			13		
	6	Plastic wrapping and packaging	39			923		
	7	Plastic bags	38			2,108		
	8	Foams	1			923		
	9	Ethylene vinyl acetate (EVA - foam)	6			66		
	10	Croc footwear	3			298		
	11	Jute bags (fragments)	2			15		
	12	Water sachets	10			42		
	13	Multilaminate drink packages	13			42		
	14	Polyurethane foam (PU foam)	42			426		
	15	Fruit drinks sachets	9			25		
	16	Torch light case	1			15		
Styrofoam	17	Styrofoam packaging fragments (granulated or laminated)	39	348	58.0%	192	480	2.2%
	18	Fragments of food container (smooth styrofoam)	300			249		
	19	Disposable plates (styrofoam)	9			39		
Textiles	20	Textile fragments (undefined)	19	43	7.2%	1,548	12,890	59.7%
	21	Clothing	19			9,140		
	22	Shoes and sandals	3			693		
	23	Bags	2			1,509		
Glass and Ceramics	24	Whole glass bottles	2	2	0.3%	1,269	1,269	5.9%
Rubber	25	Flip-flops	9	10	1.7%	647	695	3.2%
	26	Sole/Insoles	1			48		
Others	27	Medicines	2	19	3.2%	10	1,305	6.0%
	28	Diapers	6			560		
	29	Medical tubes	3			29		
	30	Cosmetics	2			19		
	31	General waste (undefined)	6			687		
			600		**100%**	**21,589**		**100%**

The chart below illustrates the quantity of waste collected along the East Side Axis, categorised by material type. Styrofoam and plastics together dominate the waste composition, accounting for a cumulative 87.7% of the total items, while textiles (7.2%) and other materials (3.2%) make up smaller portions.

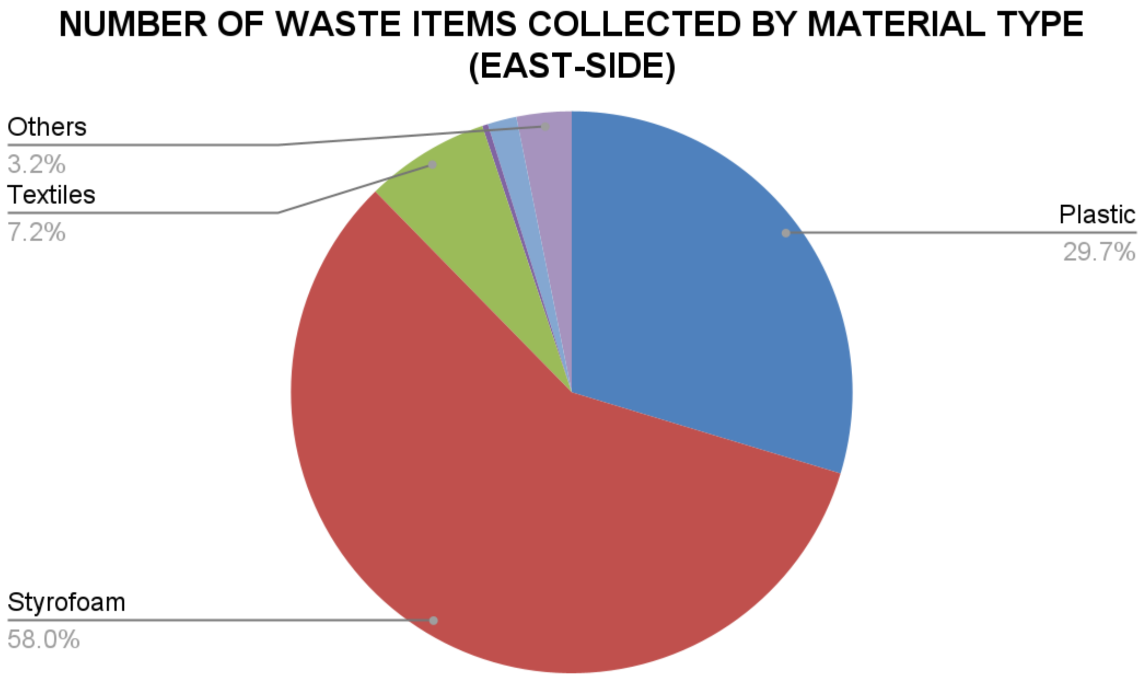

Figure 13: Waste quantification in East Side Beach

5. Key Findings

The waste characterisation conducted along the Apapa (South Side) and Tolu (East Side) Canals in Ajegunle, Lagos, revealed a clear dominance of Styrofoam and plastics as the primary waste materials. Styrofoam was the most prevalent by count, comprising 48.7% of items on the South Side and 58% on the East Side. Despite its high frequency, Styrofoam contributed minimally to the overall weight due to its lightweight nature, accounting for 11.6% of the total weight on the South Side and just 2.2% on the East Side. This material was primarily composed of food container fragments, disposable plates, and packaging materials.

Plastics also featured prominently, making up 42.8% of the total items on the South Side and 29.7% on the East Side. By weight, plastics contributed significantly, accounting for 33.4% on the South Side and 22.9% on the East Side. Common plastic items included disposable cutlery, cups, bags, and various types of packaging. These materials, like Styrofoam, are primarily single-use, low-value items that are not actively collected by the informal waste sector due to their limited economic worth. This lack of collection exacerbates their accumulation in the environment, particularly in waterways and coastal areas, where they pose significant threats to marine ecosystems.

Textiles emerged as another critical category, particularly on the East Side, where they accounted for 59.7% of the total waste weight. This category consisted of dense and durable items such as discarded clothing, shoes, and bags, which, while less frequent by count, contributed heavily to the overall waste burden. On the South Side, textiles made up 31.8% of the total weight, further underscoring their significance.

The findings highlight the overwhelming presence of single-use plastics and styrofoam, which dominate the waste stream due to their high volume and low recyclability. These materials are not collected by informal recyclers due to the absence of recycling facilities capable of generating demand for such plastics, resulting in their accumulation in urban and marine environments. This underscores the urgent need for upstream interventions such as improved waste segregation, the establishment of recycling incentives for low-value plastics, and public awareness campaigns to reduce the consumption of single-use items. Addressing these challenges is essential for mitigating waste leakage into waterways and promoting sustainable waste management practices in Lagos and beyond.