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Report - Beach Sampling and Source-to-Sink Waste Management Assessment, Ada Foah, Ghana



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1. Introduction

Ada Foah is a coastal town located at the estuary where the Volta River meets the Atlantic Ocean in Ghana's Greater Accra Region. Once a traditional fishing community, it has evolved into a prominent tourist destination, celebrated for its rich biodiversity, river islands, and proximity to the Songor Lagoon Ramsar Site. The local economy is anchored in artisanal fishing, salt mining, and hospitality, which makes environmental sustainability a critical concern for long-term community resilience.

Despite its ecological and economic significance, Ada Foah is increasingly challenged by improper solid waste management. As tourism and urban development expand, the volume of waste, particularly plastics, has risen considerably. However, the town lacks adequate waste collection services, formal disposal infrastructure, and regulatory enforcement. This has led to the widespread use of informal waste collectors, the proliferation of unregulated dumpsites, and the direct leakage of waste into rivers and the marine environment through wind and rainfall runoff.

Plastics dominate the waste stream in Ada Foah, posing significant environmental threats due to their durability and resistance to degradation. The improper disposal of these materials affects marine ecosystems, public health, and the visual appeal of the beaches, which in turn threatens the livelihoods that depend on tourism and fishing.

In response to these challenges, two interlinked activities were conducted in April 2025 under the PROTEGO initiative: a Source-to-Sink Waste Management Assessment of hospitality facilities and a Beach Sampling Exercise on a public-access shoreline. These efforts aimed to generate data on the generation, composition, and fate of solid waste in both inland and coastal environments. Together, they provide a comprehensive foundation for designing targeted policy measures, improving operational practices, and strengthening community-based environmental management in Ada Foah.

1.1. Overview of Activities

Between 3 and 6 April 2025, the PROTEGO team undertook two complementary field assessments in Ada Foah to trace the flow of solid waste from its points of generation on land to its final accumulation along the shoreline.

First, a Source-to-Sink (S2S) Waste Management Assessment surveyed twenty-two hospitality establishments i.e., six hotels and sixteen guest-houses, through structured manager interviews, two-day waste audits, and brand-level characterization at four selected facilities (Peace Holiday Resort, Heartland Hotel, Kumoji Guesthouse, and Real Hospitality).

Second, on 3 April 2025 a beach-litter survey employed a 30 m × 5 m transect on the public beach fronting the Old Ada East District Assembly (Figure 1), where fourteen participants

collected, sorted, and audited every visible non-organic item. Together, these linked activities provide a full picture of waste generation patterns, materials, brands, disposal practices, and environmental leakage pathways that threaten Ada Foah's estuarine and marine ecosystems.

Sampling Objectives

- **Hospitality Source-to-Sink Assessment:**
To quantify daily waste generation, determine material and brand composition, and map disposal pathways and leakage risks across hotels and guest-houses, thereby identifying operational and policy levers for reducing land-based sources of marine litter.
- **Sampling Objective — Beach Sampling Exercise (Transect centre ≈ 5.775602 N, 0.627533 E):**
To measure the quantity, composition, and provenance of shoreline litter along a representative public-access stretch of beach, generating evidence for targeted clean-up actions, corporate accountability, and community awareness initiatives aimed at curbing marine pollution.



Figure 1: Satellite Image of public beach fronting the Old Ada East District Assembly

The two field studies yielded a coherent picture of Ada Foah's waste landscape, linking what is generated inside hotels and guesthouses to what ultimately accumulates on the public shoreline. Across both datasets, plastics overwhelmingly dominated: they accounted for more

than four-fifths of the audit mass in hospitality facilities and nearly four-fifths of the litter items recorded on the beach. Guesthouses, which operate at higher occupancy and lower price points, generated the largest daily waste loads, while brand audits in both settings pointed to a small cluster of bottled-water and beverage producers as primary contributors. Interviews and disposal-pathway checks revealed that most facilities still depend on informal collectors or open burning/dumping, a practice reflected in the composition of beach debris just downstream. Together, these findings quantify the scale of the plastic problem, identify its main commercial sources, and trace the leakage routes that carry land-based waste into the marine environment.

2. Source-to-Sink (S2S) Assessment of Hospitality Facilities

Methodology

Over four days, the team visited 22 accommodation facilities, including six hotels and sixteen guesthouses. At each site, they interviewed the managers and, at four selected facilities they carried out two-day waste audits. The team split into two groups and completed all visits between 3 and 6 April 2025. During the interviews, they collected information about each facility's basic characteristics, the number of guests, existing waste segregation practices, and what happens to the waste after it leaves the site. At the four facilities chosen for waste audits, managers were given two transparent sacks, one labelled 'Plastics' and the other 'Non-Plastics', and were asked to place every item generated during each 24-hour period into the appropriate bag. At the end of each day, the researchers emptied the sacks onto a clean black plastic sheet, sorted the waste into standard material categories such as plastic, glass, paper or board, metal, textile, and other, weighed each category using a calibrated scale, and conducted a brand audit by recording the product name, manufacturer, and probable country of origin for each item.

The interview guide focused on several key questions: the number of guests who visited each facility in 2025, the number of guests who produced waste during the two audit days, how waste is currently separated, stored, and removed, and the final destination of the waste, whether through a formal service, informal collector, on-site burning, or disposal at a dumpsite.

The primary metrics recorded included daily waste generation measured in kilograms per day, the material composition of waste both by mass and by item count, the frequency of branded and country-specific items, and the classification of disposal pathways along with the associated risk of waste leakage.

2.1. Hospitality Source-to-Sink (S2S) Assessment

Daily audits and interviews revealed marked differences in the quantities and qualities of waste produced by hotels versus guesthouses. Guesthouses, which operate at lower price points and higher occupancy, generate noticeably larger waste loads than hotels. Across all facilities, plastics dominated the waste stream, far out-stripping glass, paper, metals, and

other fractions. Brand audits showed that a handful of bottled-water producers and beverage companies account for most identifiable packaging, while disposal pathway checks confirmed a heavy reliance on informal collectors and unregulated dumpsites.

2.1.1. Selected facilities

For the source-to-sink activity, four facilities were selected—two hotels and two guesthouses. Below is a brief summary of the key insights gathered from each site.

- Hotel 1:

This facility has approximately 40 rooms, though a few are not operational, and experiences low guest numbers for most of the year. Waste is managed internally, with staff responsible for collecting and transporting it to a local dumpsite. There is little evidence of formal waste sorting, and most materials including food waste, metal cans, plastic bottles, and plastic packaging are disposed of together. During the audit, 0.66 kg of waste was generated by 27 people on the first day, and 0.16 kg by 15 people on the second day. Plastics, especially bottles and packaging, made up the bulk of the waste. The overall low waste volumes reflect the facility's limited occupancy.

- Hotel 2:

With 48 rooms and up to 568 guests annually, this hotel separates plastic bottles, which are collected informally by individuals, while all other waste is gathered and removed by a formal collection service. Waste types mainly include plastic bottles, plastic packaging, other plastics, and cardboard. The first day's audit yielded 0.15 kg of waste from nine guests, with plastics making up the majority. On the second day, waste increased to 1.1 kg, with contributions from both lodgers and walk-in guests. The facility's system prioritises the informal collection of valuable recyclables, while the remainder is handled through formal channels.

- Guesthouse 1:

This guesthouse can host up to 26 people at a time and typically welcomes around 500 guests annually. Waste management is mixed: although bins are provided and glass bottles are separated, general waste is sometimes combined and not always sorted at source. A formal waste collection service visits every two weeks. Notably, much of the waste is brought in by guests from outside the premises, adding to the facility's waste stream. During the audit, 0.89 kg of waste was recorded on the first day. On the second day, a contamination incident in one of the bins meant only 0.22 kg could be properly measured. The guesthouse was at full capacity during the audit, and plastics were the most common waste type.

- Guesthouse 2:

This guesthouse has 16 rooms and can serve up to 1,200 guests each year. Waste management involves separating organic waste in the kitchen for separate handling, while the majority of other waste, such as plastic packaging, cardboard, paper, and cans—is collected twice weekly by a formal service. Sachet water packaging and some plastics are picked up informally. On the first valid audit day, 0.3 kg of waste was generated by 18 people, and on the

second day, 1.52 kg was collected from 28 people. The dominant waste types were plastics, disposable food packaging, and tissues. While formal systems are in place for most waste, informal collectors also play a role, especially for plastics.

2.1.2. Waste Generation per day from hotels and guesthouses

The amount of waste generated each day varies between hotels and guesthouses. In hotels, daily waste generation ranges from 0.15 to 1.11 kilograms per day, while in guesthouses the range is higher, from 0.22 to 1.52 kilograms per day. Guesthouses tend to produce significantly more waste than hotels, largely because they have higher occupancy rates due to their more affordable prices.

It is important to note that during this period, which is considered the low season, guest numbers were generally not very high. On average, each guesthouse accommodated around 25 guests, while each hotel hosted about 10 guests. Despite these occupancy rates, the average waste generation per guest was very low, less than 0.1 kilogram per person per day. According to the expert team, this figure appears unusually low, especially when compared to similar tourist hospitality settings, where waste generation typically averages around 1 kilogram per guest per day.

There could be several reasons for this discrepancy. For instance, it is possible that hotels and guesthouses did not provide all of their waste for the audit, or only a portion was collected and measured. Nevertheless, the composition of the materials collected still provides an accurate reflection of the types of waste generated at these locations, giving a reliable picture of the waste situation despite the low overall quantities recorded.

2.1.3. Material Composition by Weight

The analysis of waste composition by weight from hotels and guesthouses revealed that plastics overwhelmingly dominate, accounting for 82.4% of the total waste mass. This is a strikingly high proportion and signals a pressing need for targeted measures to reduce plastic waste in these establishments. Glass made up 7.2% of the waste by weight, while paper contributed 5.8%, and metals and other materials combined represented 4.6%.

A more detailed breakdown shows that within the plastics category, plastic bottles were by far the most numerous item, with a total of 64% bottles recorded during the audits. In addition, there were 10% of plastic packaging and 9 % classified as other types of plastic. Paper counts for the 2%, while cardboard accounted for 4%. The glass category consisted mainly of glass bottles, with 6% in weight items. Cans and other metal items were much less common, with 4% and 1% respectively item of other metals found.

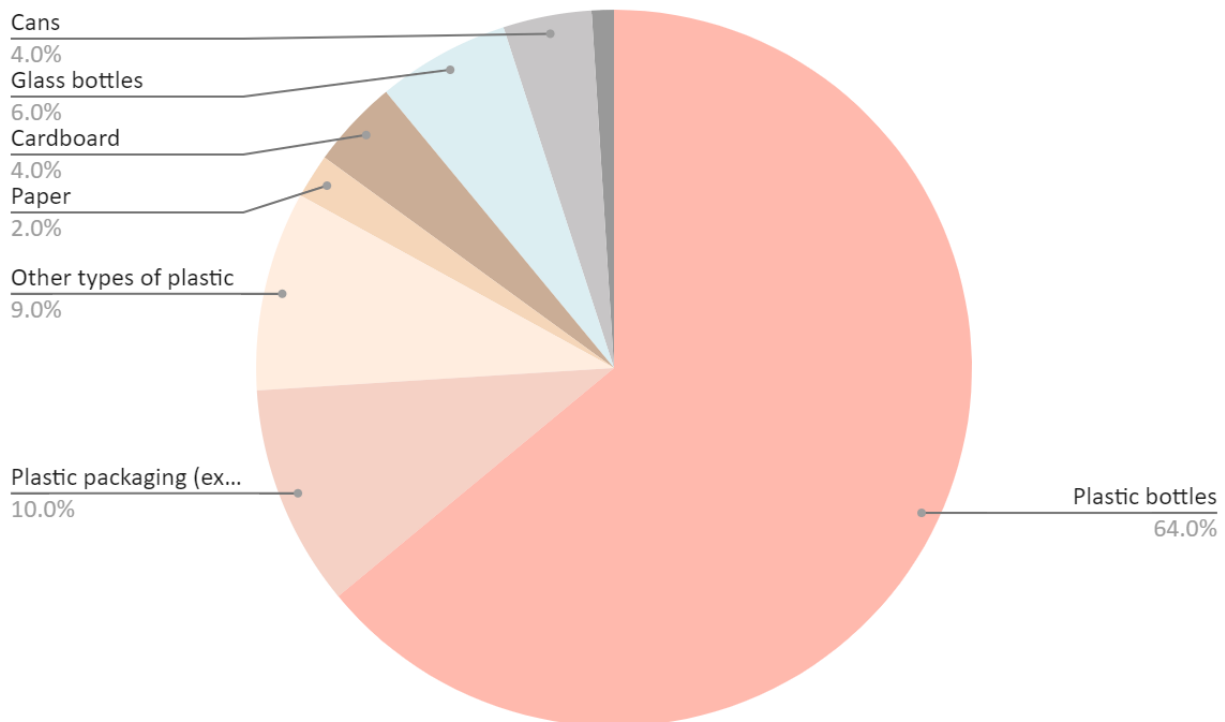


Figure 2: Cumulative waste composition for hotels and guesthouses

Although plastics are clearly the main concern due to their sheer volume and item count—particularly single-use plastic bottles—the presence of glass, paper, and metals, even in smaller quantities, should not be overlooked. Each material type presents its own challenges and opportunities for better waste management. These findings highlight the need for comprehensive strategies that prioritise reducing plastic waste, especially single-use bottles, while also ensuring the proper collection and recycling of glass, paper, and metals.

2.1.4. Brand and Country-Level Characterization

Branded waste was mainly made up of plastic bottles, sachets, and packaging from local manufacturers, indicating that both domestic consumption and supply chain packaging contribute significantly to the overall waste. Some brands and manufacturers could not be identified, but the most frequently found brands and manufacturers are listed below:

Top brands found in the waste audit:

- Aqua-Gold: 40 items
- Perla: 29 items
- Standard Drinking Water: 27 items
- Blue Cube: 27 items
- Bel-Aqua: 16 items

Top polluting manufacturers identified:

- DWALCO Limited: 40 items
- Multi-Pac Limited: 29 items
- COB-A Industries: 27 items
- Blow Group of Companies: 24 items
- Twellium Industrial Company Limited: 20 items

These results highlight the dominant role of a few brands and manufacturers in the branded waste stream, pointing to potential opportunities for targeted engagement and intervention.

2.1.5. Sources to Sinks Analysis

The qualitative information gathered from the various hotels and guesthouses included the total number of guests throughout 2024 and the pathways followed by different types of waste. For each facility, the team recorded whether waste was managed through formal collection systems, informal collectors, or other disposal methods. This information was systematically gathered across all 22 facilities.

To complement this, the results from the waste characterisation exercises specifically, the percentage breakdown of each waste type were extrapolated to provide a comprehensive overview of waste generation and management across the entire sample. By combining these datasets, the team was able to build a complete picture of waste flows within the hospitality sector in Ada.

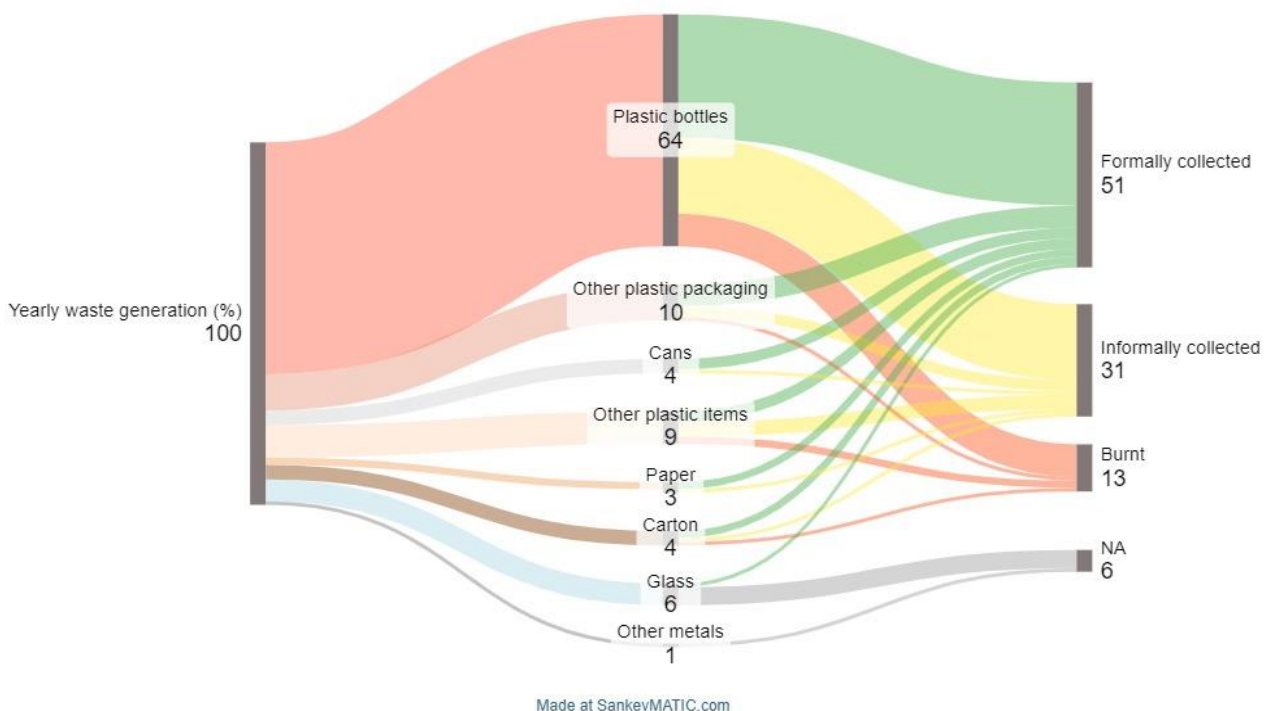


Figure 3: Sankey Diagram of Source to Sink Analysis

This Sankey diagram illustrates the movement of waste from its source (hotels plus guesthouses) through various management pathways, highlighting the relative proportions of each waste type and their respective destinations.

The outcomes of the diagram reveal several important trends. Plastic bottles are by far the largest single

waste stream, accounting for 64 units out of the total waste items tracked. Of these, the majority (51) are formally collected, while 31 items across all waste types are managed through informal collection channels. A notable portion of waste, particularly plastic packaging and other plastics—is burnt on-site, amounting to 13 items. Some materials, such as glass and metals, are either not accounted for (NA) or follow less clear pathways, with 6 items unclassified. Overall, the diagram shows that formal collection is the dominant route for most waste, but informal collection and burning still play significant roles, especially for plastics. This highlights the need for improved waste management practices and a reduction in open burning, particularly for plastic materials.

3. Beach-Litter Sampling Exercise

A complementary shoreline survey was undertaken on 3 April 2025, from 15:00 to 18:00 UTC, one day after rainfall but under clear, sunny conditions. The team demarcated a 30 m × 5 m belt transect on the public beach fronting the Old Ada East District Assembly (5.775602 N, 0.627533 E).

Fourteen volunteers, equipped with gloves and assigned specific material types, collected every visible non-organic item inside the transect. Once collection finished, items were sorted, counted, and weighed by material class; unusually heavy objects (e.g., water-logged foam) were flagged. A brand audit was then carried out using the same template applied in the S2S study. GPS points marked transect corners, and dual observers verified all counts and weights.

Recorded parameters:

- Total number of items (count)
- Aggregate mass (g / kg)
- Material composition (% of count)
- Branded products, manufacturers, and likely country of origin

By applying identical material categories, weighing protocols, and brand-audit sheets, the beach data can be directly compared to the S2S facility data, linking land-based waste generation with the litter profile observed on Ada Foah's shoreline.



Figure 4: Waste collection by PROTEGO Team from Ada site for sorting and characterization

3.1. Beach-Litter Sampling Assessment

The shoreline transect survey captured a snapshot of the debris reaching Ada Foah's public beach.

3.3.1. Material Composition of litter from Ada Beach Front

Table 5 below illustrates the Material Composition of Litter collected from the beachfront.

Table 1: Material Composition of Litter

Material Type	Item Count	Proportion (%)
Plastic	1,326	79.4%
Styrofoam	267	16.0%
Textiles	51	3.1%
Others	16	1.0%

Glass and Ceramics	9	0.5%
Paper and Cardboard	0	0.0%
Metals	0	0.0%

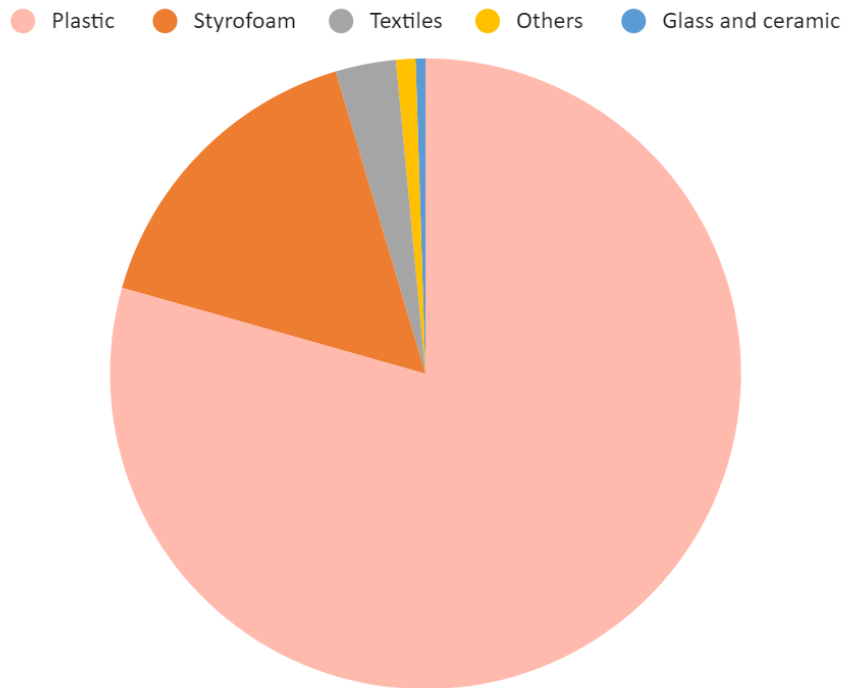


Figure 5: Material Type Distribution from Source to Sink Analysis

Observation:

Plastics dominated the litter profile, accounting for 79.4% of total items collected, reflecting widespread plastic use and challenges in disposal and recycling systems. Styrofoam was the next most common material found, accounting for 16% of total items collected. Other materials, including textiles, glass, and metals, constitute only small fractions, with paper, cardboard, and metals being negligible (0.0%). The prevalence of plastic raises environmental concerns due to its durability and slow degradation, emphasizing the need for better waste management and eco-friendly alternatives.

3.3.2. Brand and Item-Level Analysis

Common Identified items:

- Disposable cups (plastic)
- Beverage bottles
- Plastic bottle caps

- Shoes and sandals
- Plastic wrapping and packaging
- Plastic sachets (Water and Beverages)

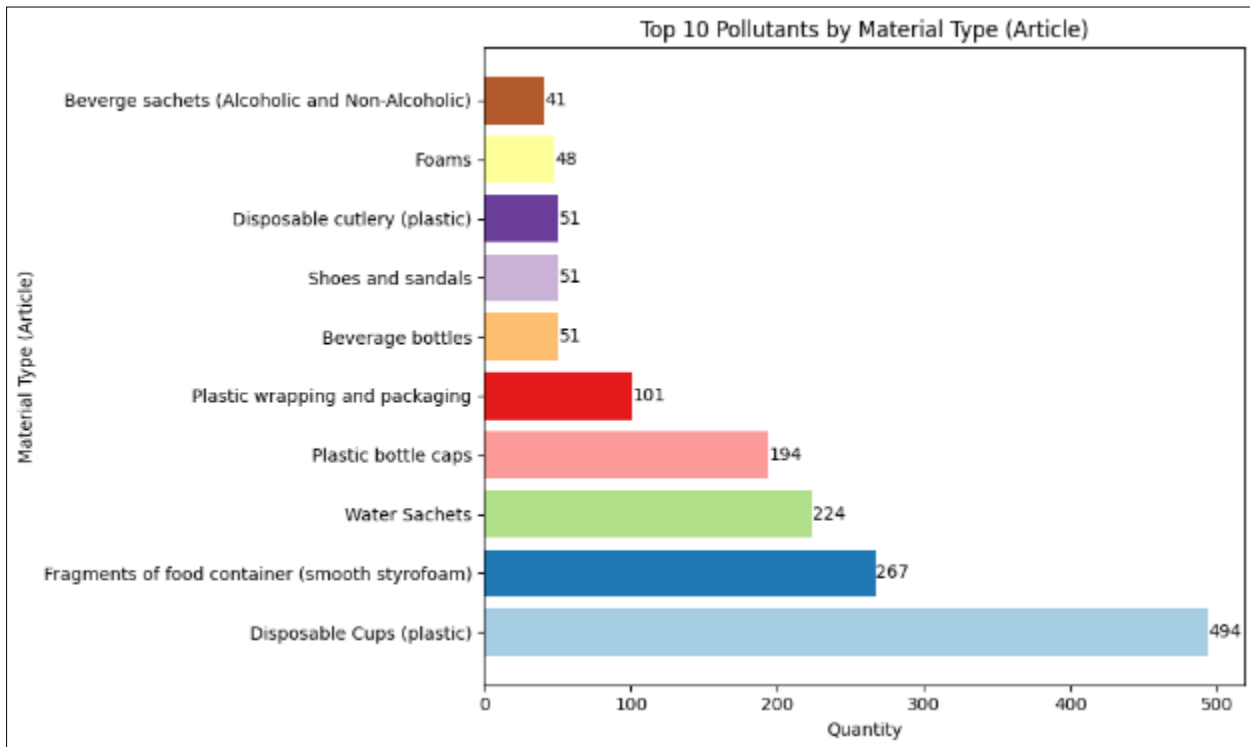


Figure 6: Top 10 Pollutant Items by Material Type from Ada Beachfront

Observations:

This visualization highlights the types of materials most frequently contributing to environmental pollution, where improper waste disposal is a critical concern.

At the top of the chart, disposable plastic cups emerge as the most prevalent pollutant, with a staggering quantity of 494 items. This figure suggests a widespread use and improper disposal of single-use plastics, likely fueled by convenience culture in beverage consumption. Following this, fragments of food containers made of smooth styrofoam rank second, with 267 items, indicating that foam packaging remains a persistent environmental threat due to its lightweight and non-biodegradable nature.

- **Water sachets**, a common packaging form for water in Ghana, come in third at **224 items**. Their high prevalence underscores the environmental cost of widely accessible, low-cost drinking water solutions in areas where alternative water infrastructure is lacking.
- **Plastic bottle caps** (194) and **plastic wrapping and packaging** (101) also feature prominently. These items are often byproducts of consumer goods and fast-moving products like PET bottles, personal hygiene products, and consumables, suggesting that both product design and post-consumption waste management systems are failing to address the end-of-life fate of these materials.
- **Beverage bottles, shoes and sandals, disposable plastic cutlery, foams, and beverage sachets (alcoholic and non-alcoholic)** round out the list, each contributing between **41 and 51 items**. While lower in quantity compared to the top pollutants, their presence reflects a mix of personal,

recreational, and household-related waste materials that find their way into the environment.

The findings suggest that addressing plastic pollution requires tackling both the **supply side** (e.g., manufacturing and packaging decisions) and the **demand side** (e.g., consumer behavior and disposal practices) in peri-urban settings like Ada. Ultimately, this data offers a valuable snapshot into the tangible manifestations of plastic pollution and can inform targeted action plans to reduce waste at the source, enhance community education, and support circular economy initiatives.

Brands Frequently Found:

- U-Fresh
- Promasidor
- Fanmilk
- Beijing Meidan Food Company
- Kadat Beverages
- BlowChem Industries (BlowGroup of Companies)
- Other local and regional beverage brands

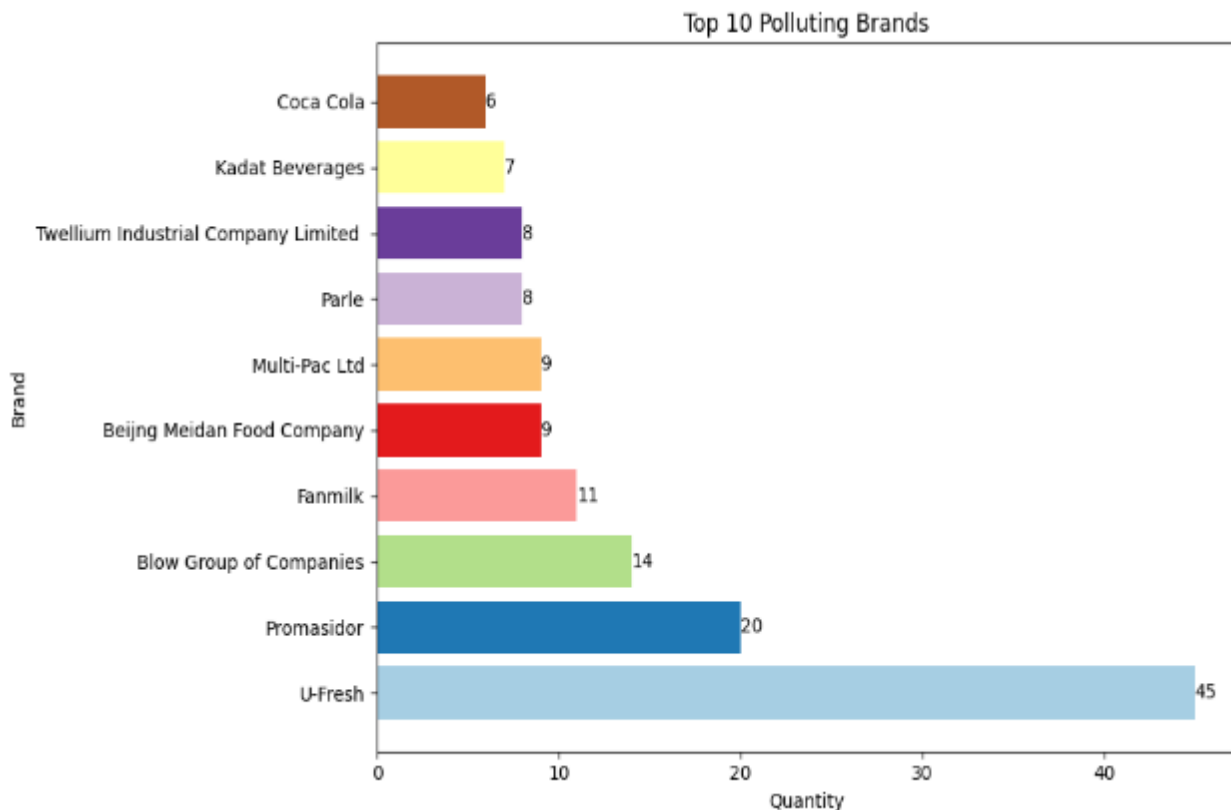


Figure 7: Top 10 Polluting Brands Identified from Ada Beachfront Litter

Observations:

The majority of the identified brands found are locally produced. A reasonable number of the items whose

brands were identified are produced internationally in countries like China, Sierra Leone, etc. Most of the items collected were plastic wrapping and packaging and PET bottles (water and beverage). This analysis indicates local, regional, and international consumer activity as primary sources. It also presents opportunities for corporate responsibility programs, including collection incentives, clean-up sponsorships, and packaging redesigns.

4. Environmental and Socio-Economic Impacts

The combined findings from the hospitality Source-to-Sink (S2S) survey and the beach-litter transect clearly demonstrate how inadequate on-land waste management practices in Ada Foah are directly linked to both ecological degradation and socio-economic risks.

4.1. Implications Identified in the Hospitality Source-to-Sink (S2S) Assessment

From an environmental perspective, the S2S assessment revealed that plastics constitute a staggering 82.4% of the audited waste mass. This creates a persistent and substantial stream of material with a high potential for leakage into the environment. Waste generated by hospitality facilities is frequently left exposed to wind and rainfall runoff, which means lightweight items are often dispersed into nearby waterways. Additionally, several establishments resort to burning their waste, a practice that not only contributes to localised air pollution but also leaves behind unburnt residues that can still find their way into the natural environment. In one particularly concerning case, a site was found to be disposing of garbage in a makeshift dump located at a nearby school, significantly increasing the risk of soil and surface water contamination.

On the socio-economic front, guesthouses were identified as the largest daily generators of waste, producing up to 1.52 kg per day. These businesses are also the most dependent on informal disposal methods, which in turn raises clean-up costs for both the municipality and the businesses themselves. The irregularity of formal waste collection and the practice of burning waste on-site—often a result of inefficiencies among waste service providers—contribute to negative perceptions that can dissuade tourists and damage the reputation of hospitality facilities. Furthermore, the presence of open waste piles and the practice of burning rubbish foster unhygienic conditions, posing occupational health risks not only to staff but also to guests.

4.2. Implications Identified in the Beach-Litter Sampling Survey

The beach-litter survey further reinforces these concerns. Environmentally, it was found that 79.4% of shoreline litter consists of plastic, with an additional 16% made up of styrofoam fragments. Both materials are highly durable and pose significant threats to fish and aquatic animals, primarily through ingestion. The prevalence of lightweight items such as cups,

sachets, caps, and wrapping materials points to ongoing leakage from land-based sources, thereby corroborating the findings of the S2S assessment.

From a socio-economic perspective, the accumulation of litter on beaches constitutes visual pollution, which diminishes the aesthetic appeal of the shoreline and has the potential to deter visitors. This not only impacts tourism but also threatens livelihoods in the fishing and hospitality industries, which are two cornerstone income streams for the Ada Foah community. The build-up of waste can also foster the presence of disease vectors and contribute to unhygienic conditions, ultimately increasing public health costs for the community.

5.Environmental Challenges Identified

The assessments conducted in Ada Foah revealed a complex set of environmental and systemic waste management challenges that threaten the town's ecosystems, economy, and public health. The following issues were consistently observed across both the hospitality sector and public coastal are:

- **Rapid tourism and urban development:** Ada is rapidly becoming a go-to destination for tourists, which has led to urbanization, causing an increase in waste generation. This waste generated, however, is not managed properly, causing it to leak into the environment and marine ecosystems.
- **Influx of plastic waste from local and upstream sources:** Plastic waste is gradually becoming a growing concern in Ada. Locally, plastic waste is generated through the following: tourists and beachgoers littering beaches, improperly managed waste from shops, bars, and restaurants located close to water bodies, and waste from fishing boats and fishing activities. Additionally, plastic waste from upstream sources such as waste brought ashore from neighbouring coastal communities and waste from inland sources like open dumpsites leaking into marine ecosystems via wind and water
- **Inadequate solid waste management infrastructure:** There is very little to no presence of waste management service providers in the town. The community lacks infrastructure for managing solid waste. However, the town has a large number of dumpsites. These open dumpsites are sources of plastic leakage into bodies of water caused by wind and rainfall.
- **Bad waste management practices:** Residents do not properly handle their waste, leading to the creation of refuse dumps all over the town. This waste is mostly from households, schools, and local businesses. Wind and rainwater eventually leak plastic waste into the environment and marine ecosystems.

Most of the community members are either fisherfolk or salt miners. The community's economy relies on artisanal fishing, salt mining, and hospitality, necessitating sustainable environmental practices to support long-term resilience.

6. Recommendations

Below, the proposed actions are grouped by the study in which they appear so decision-makers can link each measure to its evidence base.

6.1. Actions Proposed in the Hospitality Source-to-Sink (S2S) Assessment

For hospitality facilities

- Install color-coded bins to separate organics, plastics, and recyclables at the point of generation.
- Provide regular staff training on segregation and waste-reduction techniques.

For local government

- Introduce a fixed, published collection schedule dedicated to the hospitality sector.
- Enforce local bylaws that prohibit open dumping and on-site burning.
- Monitor and evaluate formal waste-service contractors to ensure reliability and coverage.

For brands and manufacturers

- Join or expand Extended Producer Responsibility (EPR) schemes.
- Sponsor buy-back and source-recovery programmes for post-consumer packaging.

For community groups

- Run public-education campaigns on waste minimisation and proper disposal.
- Mobilise volunteers for periodic waste audits and shoreline clean-ups.

Next steps highlighted in the report

- Form partnerships with beverage brands to pilot source-recovery models.
- Maintain continuous engagement with audited facilities to track improvements.

6.2. Actions Proposed in the Beach-Litter Sampling Survey

Public engagement

- Launch targeted education campaigns for residents, vendors, and tourists.
- Embed environmental modules in local school curricula to foster early behaviour change.

Waste-service providers and infrastructure

- Install plastic banks along the beach and offer incentives for returns.
- Work with informal collectors and the district assembly to oversee disposal routes.
- Create infrastructure to convert recovered plastics into eco-friendly products.
- Conduct routine performance audits of formal waste contractors.

Policy measures

- Regulate or ban single-use plastics in the municipality.
- Make event organisers and beachfront businesses responsible for post-event clean-ups.

Community monitoring

- Train local volunteers to carry out regular beach audits.
- Involve traditional leaders and local councils in environmental governance.

7. Conclusion

The evidence gathered through the Source-to-Sink (S2S) assessment of hospitality facilities and the comprehensive beach-litter survey in Ada Foah paints a clear and urgent picture of the community's waste management challenges. The dominance of plastics making up over four-fifths of both hospitality waste and shoreline litter highlights a systemic issue that spans from the point of generation within guesthouses and hotels to the final accumulation along the coast. Despite Ada Foah's growing reputation as a tourist destination and its economic reliance on fishing, salt mining, and hospitality, the infrastructure for formal waste collection and environmentally sound disposal remains insufficient. Most establishments continue to depend on informal collectors, unregulated dumping, or open burning, practices that facilitate the direct transfer of waste into the Volta estuary and the Atlantic Ocean.

The brand analysis underscores the significant role that a limited number of beverage and bottled water companies play in the local waste stream, pointing to a pressing need for producer responsibility and more robust regulatory enforcement. The beach-litter survey corroborates these findings, with plastics and styrofoam containers dominating the debris profile and mirroring the types and brands identified in hospitality audits. This not only threatens marine ecosystems but also undermines the town's tourism potential and the livelihoods of those who depend on clean beaches and healthy fisheries.

Addressing these challenges demands a coordinated approach, one that integrates improved waste segregation and collection infrastructure, targeted engagement with producers, and

community-driven education and clean-up initiatives. The data presented here provide a solid foundation for such action, demonstrating that effective interventions must target both the sources and pathways of waste. By prioritising source reduction, strengthening formal waste management, and fostering local stewardship, Ada Foah can move towards a more sustainable and resilient future for its environment, economy, and people.

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