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Household Plastic Waste and the Degradation of the Negombo Lagoon Seabed: A Hermeneutic Phenomenological Study

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***Abstract*— This document reports a hermeneutic phenomenological study of household-sourced plastic and polythene pollution on the seabed of the Negombo lagoon, on the west coast of Sri Lanka. Five long-standing lagoon users, all men over fifty years of age with between eighteen and forty years of direct experience of the lagoon, were interviewed about the changes they have witnessed on the mangrove seabed, in the fishery and in lagoon-based tourism. Their accounts are read together with the lead researcher's own field observation from cleanup work, guiding and informal conversation in the same community. The respondents describe a seabed once covered by sand and soft soil that is now patched with plastic and polythene of household rather than industrial origin, a visible fall in fish and prawn density, and damage caused by day visitors to the mangrove islands. These lived accounts correspond closely with recent instrumented sampling of microplastics in the same lagoon. The paper reads the findings through a management lens, arguing that cleanup alone will not hold unless collected plastic is given a recoverable economic value and the fishing and tourism-boat community is engaged as a stakeholder rather than a bystander. Short, medium and long term recommendations are offered, linking ecological restoration to livelihood and tourism management outcomes.**

***Keywords*— plastic pollution, Negombo lagoon, mangrove ecosystem, hermeneutic phenomenology, circular economy, sustainable tourism**

I. Introduction

The Negombo lagoon lies on the west coast of Sri Lanka and supports one of the country's richest mangrove and seagrass systems, together with a fishery that has sustained the surrounding community for generations [2]. Over the past two decades the lagoon bed, and in particular the ground among the mangrove roots, has become increasingly covered with plastic bottles, bottle caps, polythene labels, food wrapping, shampoo sachets and other single-use household items. A recent instrumented survey of the lagoon found microplastic fragments and fibers in the water, the sediment and the surface of seagrass and seaweed at every one of nine sampling sites, and traced most of this material to land-based, largely domestic sources rather than to industry [1].

What that survey cannot show is how this change is experienced and interpreted by the people who work the lagoon every day. Fishermen, tour operators and community members who have spent decades on the water carry a working memory of what the lagoon bed used to look like, and their explanations of cause and effect, plastic cover, lost seagrass, fewer fish, are a form of local knowledge that sits alongside laboratory evidence rather than beneath it. This paper reports a small hermeneutic phenomenological study built from interviews with five such respondents and from the lead researcher's own long involvement with the lagoon community, undertaken to recover that lived understanding and to ask what it implies for how the pollution should be managed.

Because plastic waste is, in the end, a resource that has been allowed to escape any economic value, the paper also reads the findings through a management lens. Collection and cleanup are necessary but, on their own, tend not to last once the funding or the volunteers move on. The discussion therefore considers what it would take to build a locally owned, economically grounded response around the same fishing and tourism community whose voices the study records.

The problem also sits squarely within Sri Lanka's own commitments under the Sustainable Development Goals on life below water and responsible consumption, and within the national push to grow coastal and lagoon based tourism as an income source for communities such as Negombo. A management response that treats plastic waste as a resource to be recovered, rather than only as debris to be removed, speaks directly to both agendas and gives local government, tourism operators and fishing communities a shared, practical reason to act together.

II. Lagoon Pollution in Context

Negombo lagoon is the largest coastal lagoon on Sri Lanka's western seaboard and one of its most productive, providing habitat for brackish-water fish, crab and shrimp species alongside extensive mangrove and seagrass beds [1], [2]. It is also, according to

existing surveys, the most polluted lagoon in the country [1]. Rapid urbanization, hotel and restaurant development along both banks, and population growth in the surrounding catchment have all been identified as pressures on the wetland system that feeds the lagoon [8].

Beyond fisheries, the mangrove stands that line the lagoon provide storm buffering, nursery habitat and carbon storage, services that are increasingly recognized as economically significant in their own right and not merely as a backdrop to fishing and tourism [2], [8]. A seabed too covered in plastic to support seagrass or healthy root systems puts these wider services at risk alongside the fishery itself, which is one reason the present study treats the ecological and the economic evidence as bound together rather than as separate strands.

The economic stake is not only ecological. Coastal and lagoon tourism is a growing part of Sri Lanka's visitor economy, and floating debris or a visibly degraded shoreline is exactly the kind of impression that shapes whether a visitor recommends a destination or avoids it. Global assessments of plastic leakage into coastal environments treat tourism revenue as one of the sectors most directly exposed to this kind of pollution, alongside fisheries [4], [5]. For a lagoon whose mangrove islands are already marketed as an eco-tourism attraction, seabed and shoreline plastic is therefore also a line item on the local tourism economy, not only an ecological indicator.

At the global scale, land-based sources are estimated to contribute the majority of plastic entering the ocean each year, carried by wind, drainage and waterways rather than dumped directly at sea [4]. Only a small fraction of all plastic ever produced has been recycled, and the remainder persists in landfill or in the wider environment for long periods [5]. Sri Lanka's own coastal lagoons are affected by exactly this pathway, and Negombo in particular has canals and storm drains that carry sewage and household runoff directly into the lagoon [1].

Fine-grained sampling of Negombo lagoon has confirmed the presence of microplastic fragments and fibers in the sediment beneath macrophyte beds, in the surrounding water and on the surface of the seagrass and seaweed itself, with blue and transparent particles the most common colors found [1]. What this body of work has not yet captured is the interpretive, experiential layer, how the people who fish, guide tourists and clean the lagoon understand what has changed and why. That gap is the starting point for the present study.

III. Methodology

A. Research Design

This study follows van Manen's hermeneutic phenomenology, a qualitative approach concerned with interpreting the meaning of a lived experience rather than measuring its physical properties [3]. The approach was chosen because the quantity of plastic on the lagoon bed is already documented by instrumented sampling; what remained unexamined was how that same plastic is lived and interpreted by the community closest to it. Consistent with a hermeneutic rather than a purely descriptive phenomenology, the lead researcher's own observations and experience of the lagoon are treated as part of the data rather than bracketed out of it [3].

B. Participants

Five respondents were purposively selected for the depth of their lagoon-related experience, which ranged from eighteen to over thirty years. All five are men over fifty years of age. Two hold biology degrees and have direct experience of seabed and mangrove cleanup work. Two are experienced fishermen, with more than thirty and more than forty years respectively of direct fishery experience, who own their own gear and are established figures within the local fishing community. The fifth is a self-taught fisheries industrialist who lives near the lagoon, hosts local and foreign visitors and works closely with the boat-owning community that serves lagoon tourism. All five raised concerns, unprompted, about pollution and about protecting the mangrove beds.

TABLE I. Respondent Profile Summary

Respondent	Background	Years of Lagoon Experience
R1	Biology graduate, seabed and mangrove cleanup experience	18
R2	Biology graduate, seabed and mangrove cleanup experience	22
R3	Independent fisherman, own gear	32
R4	Independent fisherman, own gear	41
R5	Self-taught fisheries industrialist, lagoon tourism host	25

Source: Author compilation (2025)

C. Data Collection

Interviews were conducted informally in the respondents' native dialect and recorded in writing by the researcher rather than by audio device, a limitation acknowledged here. The interviews were supplemented by the researcher's own field notes drawn from cleanup activity, guided tours and informal conversation with the wider lagoon community over an extended period. Because the interviews were unstructured, the resulting material was descriptive and not delivered in any fixed order, and was organized thematically during analysis rather than presented in the sequence collected.

D. Data Analysis

Analysis followed van Manen's four interrelated steps: uncovering thematic aspects of the material, isolating thematic statements within it, composing linguistic transformations of those statements, and gleaning thematic descriptions that capture the structure of meaning across respondents [3]. The lead researcher's own field observations were analyzed by the same process and are reported alongside the interview themes rather than in a separate section, in keeping with the hermeneutic stance that researcher and respondent understanding are woven together rather than kept apart.

E. Limitations

The sample is small and purposive by design, appropriate to a phenomenological aim but not intended to produce statistics that generalize across the wider lagoon community. Interviews were translated and written down by a single researcher rather than audio recorded, which limits verbatim precision even where the substance of each statement was checked with the respondent at the time.

IV. Findings

A. A Remembered Clean Lagoon

Every respondent drew a contrast between the lagoon they remember from their youth and its present condition. One respondent, an experienced fisherman, put it this way:

"In our youth, low and high tide sea water was clean. During rainy seasons sometimes the lagoon water became somewhat cloudy. On the sea water they had random plants for tree branches, and the like parts could be seen floating. At present we could see sea water is very cloudy with different forms of plastics floating on the sea surface as well as at various levels in the seawater."

This kind of before-and-after account recurred across all five interviews, with each respondent using personal history rather than measurement to establish that the change is real and, in their view, recent.

This directly observable change is most visible when the tide is low. As one respondent explained:

"When the water level becomes low you will see various plastics and polythenes that are among different levels of the mangrove trees and roots. It is a sore to the eye."



Figure 1. Plastic and polythene waste carried in by the high tide and caught among the mangrove roots. Photographed at low tide, when the accumulation becomes fully visible; respondents describe this as a common, recurring sight along the lagoon edge.

B. Plastic Replacing Sediment on the Mangrove Bed

Respondents with hands-on cleanup experience described a physical replacement of the lagoon floor itself, not merely debris scattered across it:

"Now when you go near the mangrove islands you are working over the season partially and largely covered with different forms of plastic and polythene cover based patches of different sizes but not sand or soft soil as it should have been."

"Mangrove roots in the mangrove clusters have polythene and plastic cover and you cannot see the bottom when the water becomes clear."

The lead researcher's own cleanup experience supports this account. Coastal stretches of the lagoon where water movement is limited were found to hold a particularly high density of trapped plastics and non-biodegradable polymers, and analysis of this material pointed consistently to household rather than industrial origin, a pattern that matches recent laboratory findings for the same lagoon [1].

C. Domestic, Not Industrial, Origin

Respondents were consistent that the source of the pollution is household consumption rather than industry:

"What is floating in the sea water in the lagoon is always domestic level plastics and polythene thrown away from the households and individuals."

This attribution matters for how the problem should be addressed. Waste that originates from many scattered households cannot be intercepted at a single industrial point of discharge, and any workable response has to reach into everyday consumption and disposal habits rather than into a factory gate.

D. Declining Fish and Prawn Density

Several respondents connected the plastic-covered seabed to a decline in catch through a fairly detailed causal chain:

"Fish and prawn density has gone down in the lagoon areas compared to the past as their food, the sea plant coverage has reduced due to lagoon bed pollution due to plastics and polythene deposited in the lagoon bed near the coastal areas."

"The better lagoon bed areas cause due to plastic covered seabed without seaweed and plants that is needed for the survival of small fish and prawn larvae, since there is no cover for them to escape from predators, leading to lower density of fish larvae and prawns."

One respondent also raised a concern that reaches beyond the lagoon itself, noting that fish living in plastic-affected water may take up microplastic that then passes further along the food chain, a concern that is consistent with the presence of fragments and fibers already measured on macrophyte surfaces in the lagoon [1].

E. Tourists and the Mangrove Islands

Lagoon-based tourism was raised, unprompted, as both a victim and a contributor. The respondent who hosts visitors to the mangrove islands described the pattern directly:

"The sundry local tourists visiting mangrove islands to spend the day recreation used to haphazardly

throw or discard the plastic bags, containers and used single-use products when leaving the islands. When you visit such islands you can experience the damage caused to the lagoon bed near such islands."

"The islands among the mangroves had nice and pleasant approaching areas, but now only a few entry points to such islands have less pollutant cover."

The same respondent described an existing, if informal, channel for addressing the problem: boat owners who transport visitors to the islands are already being approached to explain responsible behavior to their passengers, a community-led effort that had not, at the time of interview, been connected to any wider programme. The researcher's own field observation confirmed that foreign visitors who spend leisure time in the mangrove and lagoon area frequently comment on floating plastic and on the material visible on the seabed, describing it as leaving an unpleasant memory of the visit.

F. Cleanup Evidence and Waste Composition

Direct cleanup work gave the clearest picture of what the waste actually consists of. One respondent, describing seabed cleanup carried out with nearby community members, summarized the composition as follows:

"Experience in cleaning the mangrove island seabeds in removing plastics with the help of nearby communities has shown tremendous amounts of single-use plastics as well as thrown away fishing gear that are made out of polythene, nylon as well as styrofoam."

The researcher's own cleanup work over an extended period produced a similar picture: bottles, bottle caps, polythene labels, food and shampoo sachets, single-use containers and discarded nylon fishing line and net fragments recovered in quantity from the same low-flow stretches of the lagoon bed. A sample of material collected from the lagoon bed during one such cleanup is shown below.



Figure 2. Plastic waste collected during a cleanup of the nearby lagoon bed, showing the mix of bottles, containers, packaging and other single-use household items typical of what respondents describe recovering.

Not every account pointed in the same direction, and it is worth recording the exception. Fishermen using traditional mangrove-based trap fishing reported finding polythene and plastic inside their traps but did not describe this as a major disturbance to their catch, in contrast to the sharper decline reported for open lagoon fishing:

"The individual seasonal catch has gone down drastically compared to the past experience."

Read alongside the trap-fishing account, this suggests the impact of seabed plastic on catch is felt unevenly across fishing methods, a nuance that a purely aggregate measure of pollution would not capture.

V. Discussion

Read together, the interview themes and the researcher's field observation describe a single causal story that instrumented sampling of the same lagoon corroborates in its physical detail. Household plastic and polythene, carried by wind, drains and waterways rather than dumped directly into the sea, settles preferentially in low-flow areas among the mangrove roots [1], [4]. There it displaces the sand and soft sediment that seagrass and seaweed need, reducing the light available for photosynthesis and the food and shelter available to juvenile fish and prawns, which respondents link directly to a falling catch. The convergence between what respondents describe from decades of direct observation and what recent fragment and fiber counts show in the sediment and on macrophyte surfaces [1] gives the lived accounts a degree of external support that a purely interpretive study could not claim on its own.

The account is not entirely uniform, however. Trap fishing within the mangroves turned up plastic without a corresponding complaint of major catch disturbance, while open lagoon fishing was where the sharpest decline was reported. This unevenness matters for policy design: it suggests that impact, and therefore willingness to participate in a response, will vary by fishing method and by location within the lagoon, and that a single lagoon-wide message is less likely to work than one tailored to each group's own experience of the problem.

The tourism dimension adds a management consideration that a purely ecological reading would miss. A degraded lagoon bed and floating debris reduce the recreational and aesthetic value on which lagoon tourism depends, and the study's respondents identify visiting day-trippers as both harmed by and, in some cases, a contributor to the pollution. The boat-owner community that already carries tourists to the mangrove islands is, in effect, an existing stakeholder network that current cleanup efforts have not yet drawn on. Framed in management terms, this is an underused channel for behavior-change communication rather than a problem that requires a new institution to be built from nothing.

The deeper obstacle, evident throughout the interviews, is that the plastic reaching the lagoon has no assigned economic value once discarded. Research on plastic waste management in other developing economies points to the same conclusion: waste that no one can profit from collecting tends not to be collected

reliably, however strong the environmental case for doing so [6], [7]. A locally managed, decentralized approach, in which collected plastic is aggregated and channeled into recycling or reuse rather than simply removed and landfilled, has been shown elsewhere to hold up better over time than externally funded cleanup alone [6]. For Negombo lagoon, the fishing and tourism-boat community identified by respondents is a plausible anchor for exactly this kind of arrangement, since its members are already present on the water daily and already motivated by their own livelihood to see the lagoon recover.

For a management audience, the practical implication is that lagoon plastic pollution is not a problem separate from tourism and livelihood management, but one that sits inside the same planning process that already governs guiding licenses, boat operating permits and small business activity around the lagoon. Bringing seabed cleanup and source interception into that existing planning process, rather than running them as a stand-alone environmental initiative, would let the cost be shared across the tourism, fisheries and local government budgets that already have a stake in the lagoon's condition. It would also let responsibility be assigned to actors who are already organized and already present, boat associations, guest house operators and fisheries cooperatives, rather than requiring a new body to be created for the purpose. Framed this way, protecting the lagoon bed becomes an ordinary part of managing a shared economic asset rather than an add-on that has to compete with other priorities for attention and funding.

The contribution of this study is therefore less about establishing that the lagoon bed is polluted, which instrumented research has already shown, and more about showing how that pollution is understood by the people whose cooperation any lasting solution will require. Interventions designed without that understanding risk being technically sound but locally unowned.

VI. Conclusion and Recommendations

This study set out to understand, through the lived experience of five long-standing lagoon users and the researcher's own field observation, how household-sourced plastic pollution on the Negombo lagoon seabed is perceived to affect the ecology and the livelihoods that depend on it. Respondents describe a seabed once covered by sand and soft soil that is now patched with domestic plastic and polythene, a decline in fish and prawn density linked to lost seagrass and lost refuge for juveniles, and damage to lagoon tourism from both floating debris and the litter left behind by day visitors. These accounts correspond closely with recent instrumented sampling of the same lagoon, which strengthens confidence in both bodies of evidence.

Three tiers of action follow from the findings. In the short term, simple physical barriers and traps placed at drains and waterways before they enter the lagoon would intercept household plastic before it reaches open water, alongside targeted cleanup of the low-flow seabed areas and mangrove roots that respondents identify as the worst affected. In the medium term, the informal outreach already underway with mangrove-island boat operators should be formalized and extended, with clearly marked disposal points established at the entry points to popular islands. In the long term, collected plastic needs to be given a recoverable economic value through links to local recycling or reuse markets, paired with sustained education and awareness work, so that collection is sustained by ordinary economic incentive rather than by periodic volunteer campaigns [6], [7]. Embedding lagoon stewardship within the tourism management planning for the area would help ensure these measures continue once initial funding or attention moves elsewhere. Local government drainage authorities are best placed to install and maintain source interception measures, boat owner associations are best placed to carry medium term awareness messaging to visitors, and fisheries cooperatives working together with tourism operators are the natural anchor for a long term, locally managed recycling or buy-back scheme.

A further long-term measure is sustained public education aimed at changing attitudes toward the responsible use and disposal of plastic and polythene. Social media already carries strong influence over community attitudes and reaches a wide audience, so environmental groups and other interested parties could work with social media influencers to carry this message alongside the formal education system, focusing specifically on the effect of plastic and polythene on the Negombo lagoon and its mangrove-based biodiversity. Religious institutions offer a further channel into individual households that a purely formal campaign would miss. Together these channels could help people not only change their own habits but also feel able to discourage irresponsible disposal by others around them.

Because the sample was small and purposive, the themes reported here should be read as an interpretive account rather than a representative survey. A useful next step would combine this kind of phenomenological inquiry with further instrumented sampling across seasons, so that the lived and the measured pictures of the lagoon can continue to inform one another.

More broadly, the case of Negombo lagoon illustrates a pattern likely to recur across Sri Lanka's other coastal lagoons and, indeed, across many small tropical lagoons where fishing and tourism sit side by side. Where household waste has an easy, unmonitored route into a shared water body, the resulting pollution becomes at once an ecological, a livelihood and a tourism problem, and responses that treat only one of those dimensions are unlikely to hold. The hermeneutic approach used here, pairing structured interview themes with a researcher's own sustained field presence, offers a practical, low-cost way to surface that fuller picture before a management plan is drawn up, and could reasonably be repeated at other lagoon sites facing the same combination of pressures.

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