

Research Article

# Towards Climate Resilience: A Comprehensive Study on Eco-Friendly Alternatives for Single-Use Plastic Sheets in Somalia

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## Abstract

This research critically examines the recent policy intervention by the Somali government, focusing on the prohibition of single-use plastic sheets. The primary aim is to safeguard the environment and enhance public safety, aligning with global efforts to address plastic pollution and promote sustainable practices. The government's proactive approach urges manufacturers to explore alternative materials that prioritize community well-being and minimize environmental impact. This research, in response to the government's call for action, seeks to contribute comprehensive strategies that complement existing efforts. One key facet of the proposed initiatives involves research and development to identify and promote eco-friendly substitutes for single-use plastic sheets. This includes investigating materials with minimal environmental impact throughout their lifecycle. By encouraging innovation in materials science, the study aims to support the government's commitment to sustainable practices and reduce dependence on harmful substances. In addition to material innovation, the research emphasizes the importance of awareness campaigns to educate the public about the environmental and social implications of plastic usage. Community awareness is crucial for fostering a collective understanding of the need for change and garnering support for the government's policies. This aspect of the study aims to develop targeted communication strategies to engage diverse segments of the population and promote a culture of responsible consumption. Furthermore, the research advocates for the implementation of recycling programs to manage existing plastic waste effectively. Developing robust waste management infrastructure is essential for ensuring that discarded plastic materials are recycled efficiently, reducing their impact on the environment. Recognizing the economic aspects of the transition, the research proposes incentives for businesses that adopt sustainable materials. These incentives can include financial support, tax breaks, or preferential treatment in government procurement processes. By aligning economic interests with ecological responsibility, the study aims to facilitate a smooth transition and encourage widespread adoption of sustainable practices. Through a comprehensive analysis of various initiatives, the research aims to provide actionable insights for policymakers. Recommendations will be formulated to guide the government in implementing effective measures that align with its commitment to environmental sustainability and the overall safety of the Somali population. In conclusion, this research aspires to contribute practical strategies for Somalia, balancing economic interests with ecological responsibility. By fostering a harmonious coexistence between human activities and the environment, the study aims to support the government's vision of a resilient and sustainable future.

## Keywords

Single-Use Plastics, Environmental Pollution, Plastic Waste, Disposal Practices, Wildlife Harm, Community Awareness, Sustainable Alternatives, Waste Management Infrastructure

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## 1. Introduction

In the wake of growing environmental concerns and a commitment to fostering a healthier and safer future, the Somali government recognizes the imperative to transition from environmentally harmful substances to safe and harmless materials, particularly in the manufacturing and merchant sectors. This transition is crucial not only for the well-being of the environment but also for the safety of the Somali population. This introduction delves into the initiatives that the government can undertake to support manufacturers and merchants in this pivotal shift towards sustainable practices, outlining comprehensive strategies that address environmental impact and human well-being. By fostering collaboration, incentivizing innovation, and promoting responsible production, the government aims to create a more resilient and eco-conscious economy for the benefit of both present and future generations.

## 2. The Environmental Context and Initiatives by the Somali Government

The conclusion from different studies underscore the growing importance of addressing environmental degradation and emissions, which have become prominent topics in 21st-century policy discussions [1, 13, 14]. The literature extensively explores the various factors contributing to environmental degradation and emissions. The report specifically highlights Somalia's recurring environmental challenges, such as droughts, floods, and extreme winds, resulting in severe natural disasters.

As per the report, Somalia faces severe challenges like deforestation and soil erosion resulting from unregulated human activities, overgrazing of rangelands, and the impact of climate change. These issues not only jeopardize growth prospects but also pose a threat to the sustainability of traditional nomadic pastoralism and rain-fed crop cultivation [5]. By 2014, the country's forest coverage had dwindled to just 10 percent of its land area, a significant decrease from the 62 percent recorded before 1980. The shift towards private enclosures for livestock grazing and the construction of semi-permanent family shelters has intensified deforestation, with this trend showing no signs of slowing down. Furthermore, the fluctuating and diminishing water flows in major rivers, partly attributed to increased water usage in upstream basins in the Ethiopian highlands, pose a risk to irrigated crop cultivation.

This emphasizes the urgent need for comprehensive strategies to address and mitigate the environmental challenges faced by Somalia. The Somali government has initiated efforts to preserve the environment by exploring alternative options to reduce the reliance on plastic sheets.

According to the report of Anadolu Ajans, Somali President Hassan Sheikh Mahamud committed \$10 million to

combat climate change, desertification, and preserve biodiversity in the Horn of Africa [8, 9]. This announcement was made during the official launch of the Great Green Wall Initiative (GGWI) in Somalia, in partnership with the International Fund for Agricultural Development. Somalia, the most recent African Union member state to join, joins 36 other countries in the Sahara, Sahel, Horn of Africa, and Southern Africa drylands involved in the initiative. The president underscored that the GGWI signifies a significant stride in Somalia's dedication to addressing climate change and environmental degradation, which has inflicted substantial hardship on the population. A UN report points out an estimated 43,000 "excess deaths" in Somalia in 2022 due to an escalating drought in comparison to 2017 and 2018. Despite contributing only 4% of global greenhouse gas emissions, Africa is increasingly susceptible to climate shocks.

In a momentous stride towards environmental stewardship, on February 1, 2024, The Ministry of Environment and Climate Change for the Federal Government of Somalia has issued a groundbreaking decree. This decree firmly urges import and export merchants, retailers, and manufacturers to halt the trade of one-time use plastic sheets within Somalia by June 30, 2024, marking a decisive commitment to sustainability<sup>1</sup>.

This significant leap forward aligns seamlessly with Somalia's recent entry into the East African Community, where a collective dedication to preserving the environment has been at the forefront of regional initiatives. By adhering to this decree, Somalia not only reinforces its national commitment to sustainability but also contributes to the broader East African Community's shared vision of environmental responsibility. The Ministry's proactive approach, coupled with a clear deadline, not only signifies a departure from environmentally harmful practices but also propels Somalia towards a future where eco-friendly alternatives are prioritized. As part of the East African Community, Somalia stands shoulder to shoulder with neighboring nations in a unified effort to create a greener, safer, and more sustainable future for the entire region.

### 2.1. Lack of Awareness Regarding the Environmental Impact of Plastic Sheets

As per the report from [3], Somalia stands out as one of the African nations facing significant susceptibility to climate change and variability. More than 80 percent of the country's territory is comprised of arid and semiarid lands, inherently prone to extreme weather conditions like high surface temperatures, prolonged droughts, unpredictable rainfall, and strong winds. The nation's economy heavily relies on climate-sensitive sectors, including agriculture, water, energy,

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<sup>1</sup> <https://www.facebook.com/sntvnews/videos/3424321787859504>

wildlife, and health. Climate change exacerbates the vulnerability of these sectors, particularly impacting food and water security, livelihoods, health, and overall human development capabilities for the Somali population. The inadequate control over illegal deforestation and the widespread practice of burning trees have contributed to transforming parts of Somalia into a desert-like environment. Despite Somalia having a relatively low contribution to overall environmental pollution, it faces a paradoxical situation where it plays a minimal role in pollution but exhibits high consumption of plastic sheets.

The community's low awareness and careless attitudes contribute significantly to environmental pollution. Insufficient understanding of the consequences of their actions, coupled with a lack of consideration for the environment, results in irresponsible behaviors such as improper waste disposal and neglect of pollution prevention measures. This collective disregard for the environment amplifies the impact of pollutants, further degrading air, water, and soil quality.

Addressing this issue necessitates raising awareness within the community, emphasizing the importance of responsible environmental practices, and fostering a sense of shared responsibility for the well-being of the local ecosystem.

This discrepancy raises concerns about the environmental impact of plastic use within the country, hinting at the need for more effective measures to manage both deforestation and plastic consumption. For years, Somalia's extensive and isolated coastline has served as a dumping ground for hazardous waste. There is substantial evidence suggesting the illicit disposal of waste has persisted for nearly two decades. Somalia's equatorial proximity results in a consistent climate throughout the year, marked by persistent heat, occasional monsoon winds, and irregular rainfall.

The country faces significant environmental challenges, including heavy reliance on trees for energy and charcoal exports, escalating population pressures, urbanization, and conflicts over natural resources. Urgent issues include the degradation of water catchments, rangelands, agricultural lands, marine environments, as well as the ongoing problems of illegal fishing and logging [2].

## 2.2. Misuse of Light Plastic Bags

People frequently opt for lightweight plastic bags for short-term needs, often disposing of them once they reach home. This behavior contributes to the prevalent use of single-use plastics, leading to environmental concerns due to the disposal and impact on ecosystems. As outlined by the World Health Organization, the absence of effective biohazard and biological waste management procedures in both public and private health institutions allows for unregulated outbreaks of contagious diseases, posing a considerable risk to public health [15]. Particularly noteworthy is the inadequate pres-

ence of incineration systems within any of the healthcare facilities.



**Figure 1.** Depicts the process wherein individuals acquire essential items from the market using single-use plastic bags and subsequently discard them on the streets once they are no longer needed.

An illustrative instance involves a mother who routinely uses small plastic sheets to carry fruits and other items daily. Unfortunately, upon returning home, she discards these plastic sheets on the street in front of her house, contributing to litter and potential environmental harm. This practice highlights the need for awareness and sustainable alternatives to mitigate the impact of such disposal habits.

The regular misuse of plastic sheets, as exemplified by the mother discarding them on the street, significantly contributes to adverse environmental impacts. These discarded plastics can persist in the environment for extended periods, leading to issues like soil pollution.

As these plastic sheets interact with the soil, they may undergo physical alterations, breaking down into smaller particles over time. These micro plastics can pose a threat to soil health, affecting its composition and potentially leading to long-term ecological consequences.



**Figure 2.** Demonstrates the transformation of the environment from a pristine and well-maintained state to a degraded and unappealing condition due to the disposal of disregarded single-use plastic sheets mixed with sand on the streets. @ two photos taken from neighborhood street in Somalia.

Furthermore, the interaction of plastic with the soil can



exacerbate issues related to water contamination. Rainfall and other environmental factors can facilitate the movement of these plastic remnants, allowing them to enter water systems.

This not only jeopardizes aquatic ecosystems but also raises concerns about the potential transfer of contaminants up the food chain, ultimately affecting human and animal health. Addressing such misuse requires a collective effort to promote responsible disposal practices and explore sustainable alternatives to mitigate these environmental repercussions.

Exposure to soil pollutants from plastic sheets can potentially impact the respiratory system when inhaled or exhaled. The inhalation of airborne particles, including those released from plastic degradation, may lead to the deposition of pollutants in the respiratory tract. These pollutants can irritate the respiratory mucosa, triggering inflammation and potentially causing respiratory symptoms such as coughing, wheezing, or shortness of breath.

Moreover, if individuals are consistently exposed to high concentrations of airborne plastic pollutants, there is a risk of long-term respiratory health effects. Fine plastic particles may penetrate deep into the lungs, potentially causing chronic respiratory conditions and contributing to the development or exacerbation of pre-existing respiratory diseases.

It's essential to recognize the potential health risks associated with inhaling and exhaling soil pollutants from plastic sheets and to address this issue through measures such as waste management, pollution control, and promoting sustainable alternatives to reduce environmental harm.

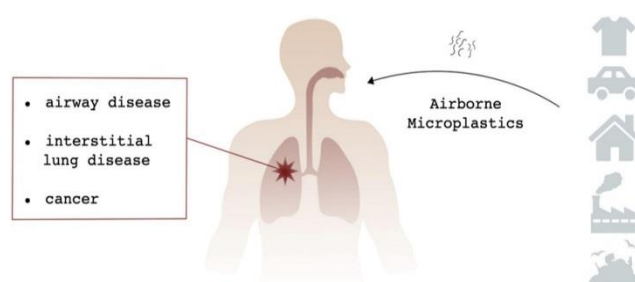
As discarded plastic interacts with the environment, it undergoes degradation, releasing contaminants into the surroundings. In particular, these contaminants can take the form of airborne dust particles, presenting a concerning health risk. When individuals inhale this polluted air, they are exposed to potentially harmful substances originating from the breakdown of plastic materials. From discussions, plastic materials commonly used in various products, may harbor unreacted monomers, additives, dyes, and pigments [4, 7]. These residual components can pose significant health risks upon exposure. For instance, certain unreacted monomers might exhibit reproductive toxicity, potentially impacting fertility and the well-being of unborn children.

Additionally, additives used in plastic manufacturing may include substances linked to carcinogenicity, posing a heightened risk of cancer development among individuals exposed to these materials.

The airborne contaminants from plastic dust can have adverse effects on respiratory health, potentially leading to respiratory issues and exacerbating pre-existing conditions. This health risk is particularly significant in areas where plastic misuse is prevalent, such as neighborhood streets in many villages of Somalia.

Addressing this challenge requires not only curbing plastic waste but also implementing measures to mitigate the release of contaminants, safeguarding the well-being of communities exposed to the consequences of plastic pollution. Recent

studies show that micro plastics are also present in our atmosphere, potentially contaminating ecosystems by fallout or inducing diseases after inhalation. By mechanisms of dust overload, oxidative stress, translocation and gene mutation, airborne micro plastics have the potential to cause airway and interstitial lung diseases [6]. The consequences of plastic pollution extend beyond humans and impact animals profoundly.



**Figure 3.** Highlights the adverse respiratory health effects resulting from the pollution of the environment by plastic sheets.

@ Image sourced from Environmental Pollution, Volume 234, March 2018, Pages 115-126 Volume 234, March 2018, Pages 115-126

Discarded plastic becomes a hazard for wildlife as animals, often mistaking it for food, ingest these materials. The ingestion of plastic by animals can lead to severe consequences, particularly in the case of marine life and terrestrial species. The plastic elements, once consumed, can cause damage to the small intestines of these animals, leading to complications such as blockages, internal injuries, and, in many cases, fatalities.



**Figure 4.** Illustrates the scenario where animals consume plastic sheets, mistakenly perceiving them as grass, leading to illness when the undigested plastic substances cause bending in the stomach and small intestines. The image originated from a Saab TV broadcast reporting on a surgical procedure for a female goat that had ingested a plastic sheet and became unwell at a university in Hargeisa, Somalia. <https://www.facebook.com/saabtv/videos/800544966813004>.

This harmful cycle of plastic use and disposal creates a dangerous ripple effect in ecosystems. Not only does it disrupt the natural balance by affecting animal populations, but it also

introduces toxins into the food chain, with potential implications for both human health and the overall biodiversity of the environment, and that is against international standards. Those engaged in business or operational roles are obligated to guarantee that individuals in the workplace are not subjected to airborne concentrations of substances or mixtures surpassing specified exposure standards. [10-12]. Addressing the plastic pollution crisis requires a comprehensive approach, including raising awareness, adopting sustainable alternatives, and implementing effective waste management practices to safeguard the well-being of both humans and the diverse ecosystems we share with animals.

### 3. Research Objective

The research objectives encompass a detailed exploration of eco-friendly alternatives to single-use plastic sheets in small supplies within Somalia, focusing on their feasibility and effectiveness. Additionally, the study aims to analyze the environmental and health impacts of current plastic disposal practices in the region, with the goal of informing sustainable solutions for mitigating these challenges.

#### 3.1. Methodology

This research employed a methodology centered around document and report reviews. In essence, the study extensively examined existing documents, literature, and reports relevant to the subject matter of eco-friendly alternatives for single-use plastic sheets in small supplies within Somalia. This method involved a systematic analysis of scholarly articles, official documents, research papers, and reports from reputable sources.

By leveraging the documents and reports review methodology, the research aimed to gather comprehensive insights, data, and perspectives on the environmental challenges posed by plastic misuse in the specified context. This approach allowed for a thorough examination of existing knowledge, current practices, and potential solutions related to sustainable alternatives. The findings derived from this method contribute to the overall understanding of the problem at hand and serve as a foundation for informed recommendations and conclusions presented in the research paper.

#### 3.2. Key Issues

- 1) Overconsumption of Single-Use Plastics: Widespread utilization of single-use plastic sheets in limited supplies within Somalia contributes to environmental pollution.
- 2) Inadequate Disposal Practices: Incorrect disposal of plastic sheets, particularly in local streets, results in soil pollution, water contamination, and harm to animals.
- 3) Limited Awareness: Scarce awareness within the community regarding the environmental impact of plastic misuse hampers the adoption of sustainable practices.

### 3.3. Proposed Measures

- 1) Advocate for Sustainable Alternatives: Promote eco-friendly substitutes for single-use plastic sheets through awareness initiatives, incentives, and collaboration with local businesses to ensure accessibility to such alternatives.
- 2) Improve Waste Management Infrastructure: Invest in upgraded waste management systems to facilitate proper disposal and recycling of plastic materials, thereby mitigating their adverse effects on the environment.
- 3) Community Educational Programs: Implement community-level educational programs to enhance awareness about the environmental repercussions of plastic misuse, instilling a sense of responsibility and encouraging behavioral change.
- 4) Government Regulations: Strengthen and enforce regulations governing plastic usage, incorporating penalties for improper disposal and offering incentives for businesses adopting sustainable packaging practices.
- 5) Research and Innovation: Support research endeavors focused on developing inventive solutions to address plastic pollution, including the creation of biodegradable materials and advancements in recycling technologies.

### 4. Conclusion

This comprehensive study sheds light on the urgent need for sustainable alternatives to address the environmental and health challenges posed by the misuse of plastic sheets, particularly in small supplies within Somalia. The observed patterns of plastic disposal, as evidenced in neighborhood streets and daily practices, contribute significantly to soil pollution, water contamination, and airborne pollutants, affecting both human and animal well-being.

The study emphasizes the interconnectedness of these issues, highlighting the potential health risks associated with exposure to plastic contaminants. It underscores the importance of adopting eco-friendly alternatives, raising awareness, and implementing effective waste management strategies to mitigate the adverse impacts on the environment and public health.

Moving forward, collaborative efforts from individuals, communities, and authorities are essential to foster a sustainable and responsible approach to plastic use. By addressing these challenges, the government together with community can work towards a healthier and more environmentally conscious future for both the people of Somalia and the global community.

### 5. Recommendation

For the government, it is recommended to implement and enforce stringent regulations on the use and disposal of single-use plastics, promoting the adoption of sustainable alternatives.

Researchers should focus on continuous monitoring and assessment of environmental impacts, contributing to an evidence-based understanding of the issue and facilitating the development of innovative solutions.

The wider community is encouraged to actively engage in awareness campaigns, adopt eco-friendly practices, and participate in local initiatives to reduce plastic waste, fostering a collective commitment to environmental sustainability.

## Conflicts of Interest

The author declares no conflicts of interest.

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