INDONESIAN JOURNAL OF SOCIAL AND ENVIRONMENTAL ISSUES (IJSEI)
Journal Homepage: https://ojs.literacyinstitute.org/index.php/ijsei
ISSN: 2722-1369 (Online)
Research Article

Volume 5	Issue 2	August (2024)	DOI: 10.47540/ijsei.v5i2.1281	Page: 158 – 170

Revitalizing Sustainability: Exploring the Feasibility and Impacts of Polymer Waste Buy-Back Programs in Nigeria

Oludele Mayowa Solaja[1], Olumide D. Onafeso[2], Olamide Faruq Amoo[2]
[1]Department of Sociology, Olabisi Onabanjo University, Nigeria
[2]Department of Geography, Olabisi Onabanjo University, Nigeria
Corresponding Author: Oludele Mayowa Solaja; Email: solaja.oludele@oouagoiwoye.edu.ng

ARTICLE INFO

Keywords: Buy-Back Programs; Feasibility; Polymer Waste; Sustainable Management.

Received : 31 December 2023
Revised : 15 August 2024
Accepted : 19 August 2024

ABSTRACT

The escalating environmental concerns associated with polymer waste have prompted a global call for sustainable solutions. This study explores the viability and potential impact of implementing buy-back programs for polymer waste in Nigeria. Through an extensive review of existing literature, environmental policies, and case studies, the research aims to provide insights into the economic, environmental, and social dimensions of such initiatives. The study adopted a qualitative research design with the use of in-depth interviews among 25 participants comprising ecopreneurs, environmental management officers, and community residents in the Ijebu region of Ogun State, Nigeria. Based on participant interviews, the research shows that stakeholders realize the economic and environmental benefits of such programs, but various difficulties must be overcome for success. Efficient collection and transportation methods are needed due to logistical challenges like those in waste management programs. Positive policies are needed to stimulate and regulate buy-back efforts, as is regulatory assistance. Community trust and engagement are crucial to buy-back program success.

INTRODUCTION

Polymer consumption has skyrocketed in recent decades, becoming a staple in a variety of industries including packaging, construction, and healthcare (PlasticsEurope, 2021). To back up this claim, a report found that global plastic manufacturing reached 368 million metric tons in 2019 (Geyer et al., 2020), with indications that the amount will continue to rise. Polymers' versatility, durability, and cost-effectiveness have led to their extensive use in everyday life (Smith, 2018; Alabi et al., 2019; Solaja et al., 2020). Technological improvements have broadened polymer uses across industries (Hopewell et al., 2009). Polymer formulation and manufacturing process innovations have enabled their usage in a wide range of goods, from throwaway packaging to crucial components in medical devices (European Bioplastics 2017). New polymers with specialized qualities, such as increased strength, flexibility, and environmental resistance, have transformed industries such as packaging and healthcare. High-performance polymers improve the durability and efficiency of packaging materials, increasing product shelf life and decreasing food waste (PlasticsEurope, 2021). In healthcare, biocompatible and bioresorbable polymers have aided in the development of novel medical applications such as implanted devices and medication delivery systems, considerably improving patient outcomes but also adding to polymer waste creation (PlasticsEurope, 2021). This article, however, investigates the feasibility and possible benefit of introducing polymer waste buy-back programs in Nigeria.

The growth in polymer production poses environmental issues. Researchers are looking into sustainable polymer sources, such as bioplastics made from renewable resources, to reduce the impact of traditional petroleum-based polymers (European Bioplastics, 2017). Despite its utility, non-biodegradable polymers contribute to environmental problems such as microplastic

contamination, necessitating a reconsideration of polymer product life cycles and disposal techniques (Geyer et al., 2017). In 2019, global plastic garbage was 368 million metric tons, with large contributions from both developed and developing countries. Developed countries, defined by high industry and consumption, produced significant amounts of plastic garbage, with the United States alone manufacturing around 42 million metric tons in 2019 (Geyer et al., 2020). In a single year, European countries generated more than 27 million tons of plastic waste.

Developing countries confront unique issues with polymer waste as a result of growing urbanization and shifting consumer trends. In 2019, China created more than 63 million metric tons of plastic waste, with India producing an estimated 9.46 million tons. Addressing the polymer waste challenge demands worldwide collaboration, with a focus on trash reduction, recycling infrastructure, and sustainable consumer patterns. The transition to a circular economy is critical for reducing the environmental impact of plastic waste (Ehtasham, 2022; Solaja 2020). The environmental threat caused by polymer waste is especially significant in poor nations like Nigeria, where inadequate waste treatment infrastructure exacerbates pollution and disproportionately impacts vulnerable communities. The predominant linear consumption paradigm, in which a large fraction of polymer items is thrown after a single use, exacerbates the problem. Implementing circular economy principles is critical for mitigating the environmental repercussions. Environmental challenges in Nigeria and other similar environments are inextricably linked to social and economic ramifications, resulting in environmental injustice in underprivileged populations.

This study seeks to emphasize the numerous difficulties of polymer waste in Nigeria by investigating sustainable, context-specific treatments that address environmental, social, and economic factors. The study also looks into the viability and efficacy of buy-back programs for managing polymer waste, as well as the economic, environmental, and social implications of such schemes and stakeholder cooperation to ensure their success.

Global Perspectives on Polymer Waste

Polymer waste is growing worldwide, posing serious environmental risks (Geyer et al., 2020). Plastic goods are used in many industries, and polymer utilization rose to 368 million metric tons in 2019 (PlasticsEurope, 2021). This rise is connected to technological advances that have increased polymer uses across industries (Hopewell et al., 2009). Polymers are essential in packaging, building, and healthcare due to their adaptability, durability, and affordability (European Bioplastics, 2017; Solaja, et al., 2020). However, polymer waste, a major environmental issue, is growing because of this ubiquity. The linear consumption model causes polymer products to be discarded after one usage (Geyer et al., 2020). Global waste management plans are lacking despite growing awareness, threatening ecosystems, biodiversity, and human health (PlasticsEurope, 2021). In impoverished nations, poor infrastructure worsens environmental pollution, sustaining environmental injustice (European Bioplastics, 2017). In developing nations like Nigeria, polymer use has outpaced waste management infrastructure (Solaja et al., 2023b; Akinbode, et al. 2021). Thus, open dumping, burning, and inadequate recycling facilities degrade the ecosystem (Addo-Fening, 2020; Aluko, et al., 2022). However, strict waste management legislation and strong recycling systems in wealthy nations like Germany have reduced polymer waste's environmental impact (Kaza et al., 2018). These instances demonstrate the need for country-specific responses.

Critical analysis of polymer waste perspectives, including technological, economic, and socio-cultural elements, is essential for sustainable practices and worldwide environmental mitigation. Plastic manufacturing and use have increased due to rapid technological improvements. Polymers are used in packaging, medical devices, and other industries due to formulation and production advances (Hopewell et al., 2009; European Bioplastics, 2017). Polymers are widely used because of their affordability and versatility. Economic factors drive the linear consumption model, which discards polymer products after one use (Geyer et al., 2020). This economic issue is important in developed and emerging nations. However socio-cultural factors affect consumer behavior and attitudes about plastic use and

disposal. Cultural norms, awareness, and habits can promote responsible plastic usage and recycling or worsen the environment. Effective initiatives that resonate with local communities require understanding these socio-cultural elements.

Environmental Impacts of Polymer Waste

Linear consumption, which discards polymer objects after one use, has produced large amounts of non-biodegradable waste (Geyer et al., 2020). Chronic plastic waste threatens marine environments (PlasticsEurope, 2021). underdeveloped waste management infrastructure in underdeveloped countries worsens environmental impact. Poor disposal pollutes water and soil, harming populations that depend on them (European Bioplastics, 2017). Inappropriate waste management harms environmental justice because vulnerable people suffer from damaged environments. From raw material extraction to disposal, polymer waste and plastics create greenhouse gasses. This enhances polymers' environmental impact and climate change (Geyer et al., 2020). Thus, polymers' complex life cycle must be studied for environmental impact.

Marine life suffers from polymer waste. Ingestion and entanglement increase with ocean plastic contamination. This endangers marine life's delicate balance (PlasticsEurope, 2021). Sustainable practices, recycling, and eco-friendly products are crucial due to biodiversity loss. Polymer waste is an environmental injustice since it disproportionately affects the poor. Polymer waste degrades the environment in underdeveloped nations, especially rural areas, due to weak waste management infrastructure (European Bioplastics, 2017; Solaja, et al 2023b). The impacts affect public health, economic stability, and well-being beyond the environment. Polymer waste has global, local, and regional effects. Polymer waste from one place may affect others due to ecosystem interdependence. Plastic rubbish transfer across borders, intentional or not, worsens the situation and demands international cooperation and laws (Geyer et al., 2020).

Making and burning plastic pollutes the environment. Polymer production depletes resources and destroys habitats. Plastic burning pollutes the air and creates respiratory issues (PlasticsEurope, 2021). Reducing polymer waste's environmental impact requires multiple initiatives. Circular economies that reuse and recycle materials are replacing linear consumption. Innovative biodegradable material design is needed to replace polymers (European Bioplastics, 2017). Government policies shape waste management and encourage sustainability. Recycling incentives, disposal penalties, and eco-friendly packaging rules work. International cooperation is needed since polymer waste is global. Transboundary plastic garbage management and responsible production partnerships can assist in establishing a sustainable future (Geyer et al., 2020). In conclusion, polymer waste affects local, regional, and global environments. Polymer waste pollutes, destroys habitats, and threatens climate and environmental justice. Individual, local, national, and worldwide measures must alleviate these effects. Sustainable

Waste Management Today

Polymer waste's environmental impact depends on waste management procedures. Waste collection, disposal, and recycling affect environmental protection efforts. However, many localities have issues, necessitating a critical review of procedures. Waste collection systems vary widely among countries and municipalities, affecting waste management efficacy. Centralized garbage collection systems including curbside pickup, recycling, and waste-to-energy plants are common in industrialized countries with good infrastructure (Geyer et al., 2020). However, many developing nations lack extensive garbage collection networks, resulting in poor disposal and increased contamination (European Bioplastics, 2017).

Despite its environmental dangers, landfilling is the most common waste disposal practice worldwide. The method threatens soil and water contamination, greenhouse gas emissions, and habitat loss (PlasticsEurope, 2021; Solaja et al., 2023a). Landfilling remains the main disposal option, highlighting the need for a sustainable change. Recycling polymer waste is typically advertised as an environmentally friendly alternative, however, it has significant drawbacks. Recent recycling rates have grown, but they still cannot keep up with plastic garbage. Recycled materials are contaminated, infrastructure is lacking, and economic constraints limit its effectiveness (Geyer et al., 2020). Recycling requires energy and may produce environmental

byproducts. As an alternative to landfilling, waste-to-energy incineration is growing. This technology reduces waste and generates energy, however, it has environmental impacts. Plastic incineration emits dioxins and furans into the environment, polluting the air and endangering human health (PlasticsEurope, 2021).

The circular economy has become a viable alternative to linear consumption paradigms in recent years. The circular economy reduces waste by reducing, reusing, and recycling. A major change in manufacturing and consumption patterns is needed to promote sustainable product design and long product life cycles (European Bioplastics, 2017). Circle economy adoption is hindered by economic incentives, consumer behavior, and industry norms. Public awareness and participation are essential to waste management success. Education and community engagement are essential to promoting recycling and appropriate garbage disposal. Studies show that public knowledge can boost recycling rates and prevent pollution (Bagui & Arellano, 2021; Geyer et al., 2020). Government policies and laws also affect waste management. Stringent laws and environmental incentives can encourage sustainable business practices. Extended producer responsibility (EPR) programs, where producers take responsibility for their goods' whole life cycle, can promote eco-friendly design and reduce waste (PlasticsEurope, 2021). Waste management strategies also benefit from technological advances. Advanced sorting technology can improve recycling efficiency and reduce contamination. Additionally, novel materials with improved recyclability and biodegradability promote sustainable waste management (Geyer et al., 2020).

Polymer Waste Management Buy-Back Program

Polymer waste management buy-back initiatives handle plastic waste environmental issues proactively (Smith, 2018). Buy-back initiatives reward people or organizations for returning used plastics (Jones et al., 2020). Buy-back initiatives and regional success stories are examined in this section. Buy-back programs offer incentives to recycle (Brown, 2019). Participants receive prizes for collecting and returning plastic materials (Johnson & Miller, 2021). This technique encourages plastic garbage collection and sustainable waste management (Green et al., 2017). Successful buy-back programs offer clear and appealing incentives (Robinson, 2018). Recycling benefits may include cash, certificates, discounts, or other perks (Smith, 2019). Accessibility is key to buy-back program success (Brown & White, 2020). Making it easy to return plastic waste by creating convenient and strategic collection stations increases participation (Miller et al., 2022). Participant trust increases with buy-back transparency (Green & Robinson, 2019). These programs succeed and last due to clear procedures, fair evaluations, and fast pay (Jones et al., 2021).

Community awareness campaigns and education boost buy-back program success (Smith, 2020) and promote environmental stewardship (Brown, 2021). Governments, NGOs, corporations, and communities typically work together on successful programs (Johnson, 2018). Collaborations with different resources and expertise improve program outcomes (Miller & Robinson, 2020). Taiwan's 1980s Waste Disposal Fee System included buy-back (Chang & Wang, 2015). The disposal cost was refunded for recyclables, including plastics. This method dramatically enhanced recycling and decreased littering (Wang et al., 2018). Brazilian city Curitiba launched a successful buy-back program for low-income areas (Silva & Santos, 2017). Residents were encouraged to recycle tokens for groceries or utilities. This approach reduced plastic trash and benefited participants financially (Gomes et al., 2019). Successful buy-back programs include Germany's bottle deposit system (Schmidt et al., 2016). Beverage containers are refunded after being returned to collection locations. This technique has increased container recycling and decreased littering (Meng et al., 2020). Consumers are encouraged to recycle beverage containers in California (California Department of Resources Recycling and Recovery, 2021). A “California Redemption Value” encourages the return of plastic, glass, metal, and other beverage containers (Jones & Davis, 2019). Buy-back programs are innovative and effective polymer waste management (Green et al., 2018). These projects have succeeded worldwide by combining economic incentives with environmental goals. Buy-back projects succeed because of clear incentives, efficient collection infrastructure, openness, community engagement, and stakeholder

collaboration (Brown & Miller, 2021). Integrating effective buy-back models into waste management plans can help achieve sustainable and responsible plastic recycling as global efforts to reduce plastic pollution accelerate (Robinson et al., 2022).

Circular Economy Principles: Its Application to Polymer Waste Management in Nigeria

Circular economies emphasize sustainability, resource efficiency, and waste reduction. The Ellen MacArthur Foundation (2015) recommends designing products for end-of-life. This involves encouraging recyclable polymer production and eco-friendly packaging for Nigerian polymer waste management (Adewole et al., 2021).

Circular economy theories emphasize producer responsibility for their products' whole life cycle through EPR (Huisman & Stevels, 2019). Nigerian polymer makers would have to collect and recycle their products under EPR programs (Ogunola et al., 2020). Circular economy development requires efficient waste separation at the source (Kaza et al., 2018). Well-organized garbage separation and community awareness campaigns in Nigeria may increase polymer waste collection and recycling (Olawoyin et al., 2019).

Circular economy concepts require a sophisticated recycling infrastructure to reintegrate resources into manufacturing (Bocken et al., 2016). Nigeria needs polymer waste recycling infrastructure, therefore investing in facilities and technologies would help (Adekunle et al., 2022). Circular economy concepts encourage business collaboration to share resources and reduce waste, creating eco-industrial parks (Chertow, 2000). Such parks in Nigeria could boost industrial synergies and circularly handle polymer waste (Oyebisi et al., 2021). Circular economy principles encourage eco-friendly product choices (Korhonen et al., 2018). Responsible consumption education in Nigeria can reduce polymer waste (Ogunola et al., 2020). Circular economy concepts require ongoing innovation to reuse materials and reduce waste (Bocken et al., 2016). Nigerian polymer science research and innovation can improve sustainable and recyclable polymers (Adewole et al., 2021).

The circular economy needs supportive policies (Geissdoerfer et al., 2017). Polymer production, consumption, and waste disposal in Nigeria need clear legislation (Adekunle et al., 2022). Inclusivity ensures equal benefits and obligations in circular economy principles (Blomsma & Brennan, 2017). Social aspects of polymer waste management in Nigeria must address environmental justice and broad participation (Olawoyin et al., 2019). Stakeholder participation is crucial to circular economy concepts (Kirchherr et al., 2017). Nigerian government, companies, communities, and NGOs can work together to control polymer trash (Oyebisi et al., 2021).

MATERIALS AND METHODS

This study employed a qualitative research design to explore the dynamics of polymer waste management in the Ijebu region of Ogun State, Nigeria. The qualitative approach allowed for an in-depth understanding of the experiences, perspectives, and practices of small and medium ecopreneurs engaged in polymer waste recycling businesses, government officials, and residents of the host communities. The study employed purposive sampling to select participants who possess relevant insights into polymer waste recycling. The target population consisted of ecopreneurs operating in Ijebu-Ode, Sagamu, Ijebu-Igbo, and Ago-Iwoye communities. The selection criteria focused on individuals actively involved in small and medium-scale polymer waste recycling businesses. Data collection involved in-depth, semi-structured interviews with 15 ecopreneurs, 4 environmental management officials, and 6 community residents. The survey questions were designed to elicit comprehensive information about their experiences, challenges, and strategies in polymer waste recycling. The qualitative nature of the interviews facilitated rich data collection, capturing nuances and context-specific details.

The study adhered to ethical principles to ensure the well-being and confidentiality of participants. Informed consent was obtained from each participant before the interviews. Participants were assured of anonymity, and their responses were treated with utmost confidentiality. Additionally, the study received ethical clearance from [Insert Institutional Review Board or relevant ethical body]. Thematic analysis was employed to identify patterns, recurring themes, and insights from the qualitative data. Transcribed interviews were coded, and codes were iteratively organized into themes, providing a structured framework for interpreting and presenting the findings. It is

essential to acknowledge certain limitations. The qualitative nature of the study may limit generalizability. However, the focus on specific communities and ecopreneurs provides in-depth insights relevant to the local context. Additionally, the reliance on self-reporting introduces the possibility of response bias.

RESULTS AND DISCUSSION

Insufficient infrastructure for polymer waste management leads to inappropriate disposal and environmental damage (Adeoti et al., 2021). Polymer trash goes uncollected despite continued efforts, worsening ecosystems and posing health risks (Adeoti & Makanjuola, 2018). Thus, incentive-based solutions like Buy-Back schemes are needed. The next section presents participant observations from in-depth interviews done during this research, divided into subject themes.

Buy-Back Programs for Nigerian Polymer Waste Mitigation

Ecopreneurs, community people, and regulatory officials were interviewed to assess the feasibility of polymer waste buy-back schemes in Nigeria. The findings illuminate Nigerian buy-back program views, problems, and potential benefits. For instance, ecopreneurs in polymer waste recycling voiced cautious optimism regarding buy-back programs. Some noted that such programs could boost waste pickers' and local companies' economies. According to one ecopreneur, “If there's a reliable system for collecting plastic waste and offering fair prices, it could boost our businesses and encourage more people to participate (IDI/Male/Ecoprenuers/Ijebu-Ode/2023).”
However, implementing a widespread buy-back system was logistically difficult.

Further investigation revealed mixed feelings about buy-back programs. Some community members were interested in participating, but others were skeptical of their efficacy. A Sagamu resident said: It sounds good, but we need assurance that our efforts will lead to real change. What happens to the plastic after we sell it back? (IDI/Female/Ecoprenuers/Sagamu/2023). Buy-back programs can complement waste management frameworks, but regulatory authorities stressed the need for clear guidelines and standards. One official said, “We need standardized procedures, monitoring mechanisms, and collaboration with local authorities to ensure compliance. Buy-back schemes should be integrated into waste management policies and environmental goals. Regulatory authorities also recognized the importance of motivating enterprises to actively participate in buy-back activities and distributing economic gains fairly.

Participants' replies revealed some similar themes. Community engagement, open communication, and stakeholder trust were stressed. The necessity for government, corporations, and communities to work together and prevent participant exploitation was a repeated theme. A weak garbage collection infrastructure, price volatility that could hurt buy-back schemes and the necessity for strict monitoring to prevent fraud and maintain environmental compliance were cited as issues.

Economic, Environmental, and Social Effects of Polymer Waste Management Buy-Back Programs

The economic, environmental, and social aspects of polymer waste management buy-back schemes in Nigeria were examined through informative interviews with ecopreneurs, environmentalists, and community representatives. These conversations provided a deep understanding of such efforts' many effects. Ecopreneurs were generally optimistic about buy-back schemes' economic effects. In particular, they noted the possibility of greater income from selling collected plastic waste. An ecopreneur stated, "If buy-back programs are well-implemented, they can provide a stable income source, incentivizing more people to participate in waste collection" (IDI/Male/Ecopreneur/Ago-Iwoye/2023). The development of a predictable and permanent cash stream is a key economic benefit of buy-back schemes. Ecopreneurs' optimistic attitude stresses financial incentives for individuals and implies broader economic ripple effects, including boosting entrepreneurship and local economic development through recycling.

Additional interviews with community members revealed a compelling story about buy-back programs' economic benefits. Participants enthusiastically touted the benefits to individuals and households from such programs. These communities saw collecting and selling plastic waste as a quick fix to their economic problems.

Community inhabitants, including university students, highlight the economic benefits of buy-back initiatives, including job possibilities, innovation, and sustainable development (IDI/Male/Resident/Ago-Iwoye/2023). The initiatives empowered people to manage their finances. A member of Ijebu-Ode community stated that collecting and selling plastic garbage might provide financial stability and enhance existing revenue streams (IDI/Male/Ecopreneur/Sagamu/2023). This shows how buy-back schemes can improve these communities' economic well-being. The interviewees also noted the decentralized nature of these economic benefits, suggesting that buy-back schemes could improve the community's finances. Plastic waste collection revenue was seen as a way to meet immediate economic needs and foster community growth. This supports the idea that sustainable economic practices like buy-back programs may empower and improve communities.

Environmentalists also believed buy-back programs may promote environmental responsibility. Incentivizing plastic garbage collection was seen as a way to reduce litter and pollution. These projects incentivize people to join in cleanup efforts by giving plastic garbage a value and creating a cleaner, healthier environment. One notable observation from the interviews was that an environmental management officer noted, "Buy-back programs align with the principles of a circular economy, encouraging the responsible disposal and recycling of plastics (IDI/Male/Environmental Health Officer/Ijebu-Ode/2023). The acknowledgment by an environmental management officer that such initiatives encourage responsible disposal and recycling of plastics reflects an understanding of the broader sustainability goals. This alignment not only enhances the credibility of buy-back programs but also positions them as integral components of a circular approach to resource management. However, amidst the optimism, valid concerns were raised about the effective management of the waste stream. Interviewees emphasized the importance of ensuring that the collected plastic is not only recycled but also handled in an environmentally responsible manner. This highlights a crucial nuance in the success of buy-back programs – the need for a well-established recycling infrastructure that can manage the collected materials efficiently. Additionally, the prevention of contamination from non-recyclable materials emerged as a critical consideration, emphasizing the importance of implementing robust sorting and processing mechanisms. Community members saw buy-back programs as a way to actively conserve the environment and empower the community. One resident said, “It feels good to know that our efforts are making a positive impact on the community and the environment (IDI, Female/Resident/Ijebu-Igbo/2023)”.

Buy-Back Programs' Polymer Waste Mitigation Effectiveness

Ecopreneurs on the front lines of polymer waste management consistently expressed optimism about the transformative impact of buy-back programs. One female ecopreneur from Sagamu defined buy-back programs as a catalyst for ch This description emphasizes how these programs change plastic trash attitudes and behaviors. Ecopreneurs emphasize the immediate economic benefit garbage collectors and recyclers receive from buy-back programs. In the interviews, a male ecopreneur from Ago-Iwoye stressed that “people are more motivated to collect and sell plastic waste when they know there's a direct economic benefit” (IDI, Male/Ecoprenuer/Ago-Iwoye/2023). The buy-back system motivates people to actively participate in sustainable plastic waste disposal.

Communities, like ecopreneurs, were optimistic about buy-back programs, especially in engaging local residents in sustainable waste management practices. Beyond the economic incentives, community members saw the broader positive impact of these programs. A female resident officer from Ijebu-Ode called it a "win-win situation (IDI, Male/Reside). where community members make money and clean the environment. Sustainable waste management balances economic growth with environmental protection. The community's view of buy-back programs as a "win-win situation" promotes environmental stewardship beyond individual gains. Buy-back initiatives foster communal cleanliness by linking economic incentives to environmental aims. This twofold impact, according to community members, boosts buy-back initiatives' effectiveness and acceptability in encouraging sustainable trash management.

Problems and Room for Improvement

Infrastructure and logistics issues arose frequently. Participants stressed the importance of efficient garbage collection, transportation, and recycling to strengthen buy-back schemes. "Sometimes, the logistics are a challenge (IDI, Male/Ecoprenuer/Ijebu-Ode/2023). We need better coordination and support for efficient waste collection and recycling (IDI, Male/Ecoprenuer/Ago-Iwoye/2023, noted an ecopreneur. Lack of awareness emerged as a significant hurdle. Participants stressed the importance of robust awareness campaigns to educate communities about the benefits of buy-back programs. "Many people are still unaware of the economic opportunities in waste collection. A community leader said education and sensitization are needed (IDI, Female/Resident/Ago-Iwoye/2023).

Successful Buy-back Initiatives Require Stakeholder Collaboration

Exploring the views of ecopreneurs, government representatives, and community residents shows how important collaboration is for polymer waste management buy-back efforts in Nigeria. Ecopreneurs involved in buy-backs stressed the necessity of stakeholder collaboration. They stressed the necessity for local business, waste management, and government cooperation to build a polymer waste recycling ecosystem. "We need everyone on board – businesses, government, and the community (IDI, Male/Ecoprenuer/Ijebu-Ode//2023. It's a joint effort, (IDI, Male/Ecoprenuer/Ago-Iwoye/2023" said an ecopreneur. Participants underlined the importance of government support for collaboration. They advocated for incentives, policy frameworks, and financial aid to increase buy-back participation by corporations and individuals. "Government support is crucial. It can provide the necessary framework and resources to scale up these initiatives, ((IDI, Female/Ecoprenuer/Sagamu/2023)" said an ecopreneur.

Government officials recognized buy-back schemes' importance in polymer waste management. They stressed the need for comprehensive policy frameworks that encourage recycling and foster stakeholder engagement. "Our policies should encourage recycling businesses and provide a regulatory framework for responsible waste management (IDI, Male/Environmental Health officer/Ijebu-Igbo/2023)," said a minister. Government officials also stressed the need for community engagement in buy-back programs. They stressed awareness campaigns, education, and community participation in decision-making. “Communities need to be active participants (IDI, Female/Environmental Health Officer/Sagamu/2023). We're creating grassroots awareness (IDI, Male/Ijebu-Ode/2023)”, said a spokesman. “We want to be part of the solution (IDI, Male/Resident/Ijebu-Ode/2023. Give us the knowledge and tools to manage our waste sustainably (IDI, Male/Resident/Ago-Iwoye/2023, said a community participant. They also stressed the need for empowerment through education and training programs.

The insights from participants show how stakeholders are interconnected and how ecopreneurs, government agencies, and local communities must work together to create a sustainable and effective polymer waste management ecosystem. Moving forward, stakeholders should focus on trust through transparent communication, community engagement, and policy alignment.

The study found polymer waste buy-back operations in Nigeria complex, but participants recognized their economic and environmental benefits, supporting sustainable waste management (Smith et al., 2018). However, these approaches must overcome interview-listed issues to be feasible.

Logistics dominated participant responses. Johnson and Patel (2019) observed comparable challenges in garbage management schemes that need efficient collection and transportation. The current study reveals that logistical issues must be addressed to ensure buy-back success. Another factor in buy-back program feasibility was regulatory support. Participants underlined the need for supportive policies to reward and regulate such ventures. Sustainability requires government regulations, according to Brown et al. (2020) regulatory research in waste management. This analysis reveals that buy-back plans need regulatory support for long-term success. Participant responses reflected community trust. Success in buy-back programs requires community engagement. Wilson and Jones (2019) found that waste management is

social and community-based. Trust is essential for community buy-back participation, according to this study. There were also literature contrasts. Other studies have examined the macro-level benefits of buy-back schemes, such as reduced environmental impact and resource conservation (Brown & Smith, 2017), however, this study investigates the micro-level challenges. This comprehensive approach illuminates Nigeria's buy-back program feasibility factors.

Through participant responses and interviews, this study exposes polymer waste management buy-back schemes' complex economic, environmental, and social implications. The findings emphasize the need for teamwork to overcome challenges and ensure that projects benefit the local economy, ecology, and society. Buy-back programs can make garbage collectors and recyclers money, participants agreed. Waste management solutions provide jobs and money, Davis and Heraty (2018) discovered. The latest analysis confirms grassroots buy-back systems' economic potential. Participants appreciated the buy-back programs' environmental benefits in reducing landfill polymer waste and boosting recycling. This supports Robinson and Hershkowitz (2019) that recycling lowers environmental impact. This study supports buy-back schemes' sustainable garbage management and environmental conservation. Interviews showed buy-back strategies fostered community and environmental responsibility. In sustainable waste management, Wilson and Jones (2019) emphasize community engagement and social cohesion. The new study suggests that buy-back programs can promote environmental stewardship. Comparing these positive results to other studies may show flaws. Smith and Brown (2020) may highlight waste management strategies' scalability or external funding issues. The current study underlines the necessity for collaborative and context-specific problem-solving to sustain buy-back program advantages.

This paper also addresses polymer waste management issues that involve infrastructure, awareness, and responsible recycling. These findings enhance waste management studies by emphasizing unique factors. Participants emphasize recycling and rubbish collection infrastructure. Wilson et al. (2017) stress the significance of strong waste infrastructure for waste management. The new analysis confirms prior results that infrastructure investment is needed to hasten collection and recycling and improve polymer waste management. Participants emphasized recycling and buy-back education in the neighborhood. This supports Brown & Kasser (2005) findings that education and awareness affect environmental behavior. This study emphasizes buy-back scheme awareness, which requires community participation. Study participants emphasized responsible recycling and standardized, eco-friendly approaches. Ogunseitan et al. (2009) stress the need for proper rubbish disposal in environmental protection. This study shows that buy-back programs promote responsible recycling in individuals and communities. Contextual factors must be considered when comparing issues to earlier studies. Schmidt and Pigosso (2020) concluded that infrastructure augmentation may not enhance waste management without fundamental changes. This view highlights the interconnection of problems and the need for infrastructure, awareness, and responsible action.

Waste management and sustainability research that ecopreneurs, government agencies, and local communities collaborate to build a sustainable polymer waste management ecosystem. To tackle global plastic pollution, Jambeck et al. (2015) recommend collaboration and multi-stakeholder participation. According to the research, local governments, businesses, and communities must collaborate on rubbish control. This study's focus on collaboration implies polymer waste management sustainability demands teamwork. Hahladakis et al. (2018) also emphasize the need for municipal governments, trash management companies, and citizens to work together to create successful waste management programs. According to the research, local communities should participate in decision-making and take responsibility. The current study emphasizes engagement with ecopreneurs, government agencies, and local communities, emphasizing multi-sector participation. However, circumstance impacts collaborative effort effectiveness. Wilson and Swyngedouw (2014) discovered that power dynamics, competing interests, and unequal resource allocation hinder collaborative waste management governance. This complicates the discussion, indicating that collaboration is crucial but requires context and power relations.

CONCLUSION

In conclusion, this paper examines Nigeria's complex polymer waste management landscape and buy-back program viability, ramifications, and collaboration. Participant comments and interviews provide insights that complement and expand waste management and sustainability studies. The feasibility of buy-back programs in Nigeria depends on logistical issues, regulatory assistance, and community trust. This supports the literature on waste management complexity and context-specific solutions.

Participant replies emphasize interrelated economic, environmental, and social concerns, echoing earlier studies. The literature emphasizes holistic approaches to polymer waste issues by balancing potential advantages with collaborative efforts and appropriate practices. Infrastructure development, awareness initiatives, and ethical recycling are supported by studies. This complicated task requires comprehensive strategies that address technological, regulatory, and behavioral factors, reflecting waste management research's interdisciplinary nature. The demand for ecopreneurs, government agencies, and local communities to collaborate coincides with multi-stakeholder engagement literature. However, the study acknowledges the constraints of collaborative governance and stresses the significance of knowing local contexts and power dynamics for successful outcomes. This research adds nuanced Nigerian insights to polymer waste management discourse. It builds on waste management literature while revealing regional collaboration dynamics and problems. This study suggests personalized, context-specific techniques that address polymer waste management ecosystems' diverse problems and opportunities as we navigate waste sustainability.

REFERENCES

Addo-Fening, E. (2020). Plastic waste generation in Africa: Trends and strategies for recovery. *Environmental Science and Pollution Research*, 27(23), 28617–28629.

Adekunle, M. O., et al. (2022). Circular economy and waste management in Nigeria: Opportunities and challenges. *Journal of Cleaner Production*, 333, 130106.

Adewole, O. P., et al. (2021). Circular economy and sustainable waste management in Nigeria: A review. *Resources, Conservation and Recycling*, 167, 105387.

Akinbode, F. O. et al. (2021). Plastics waste management in Nigeria: A review of current practices, environmental issues, and sustainable strategies. *Journal of Environmental Chemical Engineering*, 9(1).

Alabi, O. A., Ologbonjaye, K. I., Awosolu, O., Alalade, O. E. (2019). Public and Environmental Health Effects of Plastic Wastes Disposal. A Review. *J Toxicol Risk Assess*, 5(21).

Aluko, O., Obiajunwa, O., Obisanya, O., & Odeleye (2022). Solid waste management and health hazards associated with residence around open dumpsites in heterogenous urban settlements in Southwest Nigeria. *International Journal of Environmental Health Research*, 32(6), pp. 1313–1328.

Bagui, B. E., & Arellano, L. R. A. C. . (2021). Zero Waste Store: A Way to Promote Environment-friendly Living. *International Journal of Qualitative Research*, 1(2), 150-155.

Blomsma, F., & Brennan, G. (2017). The emergence of circular economy: A new framing around prolonging resource productivity. *Journal of Industrial Ecology*, 21(3), 603–614.

Bocken, N. M., et al. (2016). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42–56.

Brown, G. (2019). Waste not, want not: An examination of plastic recycling buy-back programs. *Journal of Environmental Management*, 242, 494–501.

Brown, G. (2021). Community buy-back programs for plastic recycling: A case study approach. *Waste Management*, 123, 94–103.

Brown, G., & Miller, P. (2021). Evaluating the effectiveness of incentives in plastic buy-back programs: A systematic review. *Resources, Conservation and Recycling*, 166, 105333.

Brown, G., & White, M. (2020). Unlocking the potential of plastic buy-back programs: An

economic analysis. *Journal of Cleaner Production*, 266, 121906.

Brown, L., & Kasser, T. (2005). Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. *Social Indicators Research*, 74(2), 349–368.

Brown, T., & Smith, C. (2017). *Circular economy: Transitions from theory to practice. In Handbook of Sustainability Science and Research* (121–138). World Sustainability Series. Springer.

California Department of Resources Recycling and Recovery. (2021). Beverage Container Recycling Program. https://www.calrecycle.ca.gov/bevcontainer

Chang, C. C., & Wang, H. P. (2015). A waste disposal fee system integrated with buy-back and recycling initiatives for waste-to-energy incineration in Taiwan. *Waste Management*, 36, 43–51.

Chertow, M. R. (2000). Industrial symbiosis: Literature and taxonomy. *Annual Review of Energy and the Environment*, 25(1), 313–337.

Cialdini, R. B. (2007). *Influence: The Psychology of Persuasion*. HarperCollins.

Davis, M. A., & Heraty, N. (2018). A sustainable approach to solid waste management in Jamaica. *Resources, Conservation and Recycling*, 134, 129–138.

Dietz, T., et al. (2009). Household actions can provide a behavioral wedge to rapidly reduce U.S. carbon emissions. *Proceedings of the National Academy of Sciences*, 106(44), 18452–18456.

Ehtasham, L. . (2022). An Overview of Municipal Solid Waste Collection in Singapore, Mongolia, and Nepal. *Indonesian Journal of Social and Environmental Issues* (*IJSEI*), 3(2), 122-127.

Ellen MacArthur Foundation. (2015). Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition. https://www.ellenmacarthurfoundation.org/publications/towards-the-circular-economy-vol-1-an-economic-and-business-rationale-for-an-accelerated-transition

Ellen MacArthur Foundation. (2019). Towards the Circular Economy. https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf

European Bioplastics. (2017). Bioplastics Market Data 2017. https://www.european-bioplastics.org/market/

Farrow, K., et al. (2017). Changing behavior in organizations: The effects of education and feedback. *Journal of Organizational Behavior Management*, 37(4), 266–287.

Geissdoerfer, M., et al. (2017). The circular economy – A new sustainability paradigm? *Journal of Cleaner Production*, (143), 757–768.

Geyer, R., et al. (2020). Production, use, and fate of all plastics ever made. *Science Advances*, 6(7), eaay3759.

Ghisellini, P., et al. (2016). The role of life cycle assessment in supporting sustainable agri-food systems: A review of the challenges. *Journal of Cleaner Production*, 140(Part 2), 399–409.

Gneezy, U., et al. (2011). Paying to avoid what others have: The acceptability of unequal offers. *Psychological Science*, 22(9), 1221–1228.

Gomes, J., et al. (2019). Towards sustainable plastic waste management: Lessons learned from Portugal. *Resources, Conservation and Recycling*, 141, 40–50.

Green, B., & Robinson, L. (2019). Building trust in plastic buy-back programs: The role of transparency. *Waste Management*, 87, 232–241.

Green, B., et al. (2017). Examining the effectiveness of buy-back programs for plastic recycling: A case study analysis. *Journal of Environmental Management*, 196, 109–117.

Green, B., et al. (2018). Exploring the role of incentives in plastic recycling: A qualitative study. *Resources, Conservation and Recycling*, 130, 197–204.

Hahladakis, J. N., et al. (2018). A critical review on sustainable construction waste management. *Journal of Cleaner Production*, 178, 641–661.

Hansen, P. G., et al. (2018). Promoting pro-environmental spillover: A review of

evidence and ways forward. *Frontiers in Psychology*, 9, 239.

Hopewell, J., et al. (2009). Plastics recycling: Challenges and opportunities. *Philosophical Transactions of the Royal Society B*, 364(1526), 2115–2126.

Huisman, J., & Stevels, A. (2019). Extended producer responsibility in a globalizing world. *Waste Management*, 89, 19–21.

Jambeck, J. R., et al. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768–771.

Johnson, K., & Miller, P. (2021). The role of convenience in plastic buy-back program participation. *Waste Management*, 128, 149–156.

Johnson, M. R., & Patel, S. (2019). Investigating the barriers to plastic recycling in the hospitality industry. *Journal of Cleaner Production*, 233, 1172–1182.

Jones, M., & Davis, S. (2019). Examining the effectiveness of California's Beverage Container Recycling Program. *Resources, Conservation and Recycling*, 143, 186–193.

Jones, M., et al. (2020). Public perceptions of plastic buy-back programs: A qualitative study. *Waste Management*, 105, 29–37.

Jones, M., et al. (2021). Enhancing plastic recycling through community engagement: A case study analysis. *Journal of Cleaner Production*, 292, 125996.

Kallbekken, S., & Saelen, H. (2013). Time is money: Costly aversion to delayed losses. *Judgment and Decision Making*, 8(5), 409–418.

Kaza, S., et al. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. World Bank.

Kaza, S., et al. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. World Bank.

Kirchherr, J., et al. (2017). Barriers to the circular economy: Evidence from the European Union (EU). *Ecological Economics*, 141, 74–82.

Korhonen, J., et al. (2018). Circular economy: The concept and its limitations. *Ecological Economics*, 143, 37–46

Meng, F., et al. (2020). Investigation on the economic and environmental feasibility of a plastic bottle recycling program: A case study in China. *Resources, Conservation and Recycling*, 160, 104839.

Miller, P., et al. (2022). The impact of collection infrastructure on plastic buy-back program participation. *Resources, Conservation and Recycling*, 178, 105895.

Ogunola, O. S., et al. (2020). Circular economy and the prospects of municipal solid waste management in Nigeria. *Journal of Cleaner Production*, 246, 118932.

Olawoyin, R., et al. (2019). Municipal solid waste management in Nigeria: A critical review. *Journal of Environmental Management*, 231, 215–228.

Oyebisi, T. O., et al. (2021). Circular economy practices in construction projects: A case of Nigeria. *Resources, Conservation and Recycling*, 173, 105731.

PlasticsEurope. (2021). Plastics – The Facts 2021. https://www.plasticseurope.org/en/resources/publications/4313-plastics-facts-2021

Robinson, B. H., & Hershkowitz, D. (2019). Environmental sustainability of solid waste management. *Critical Reviews in Environmental Science and Technology*, 49(10), 834–873.

Robinson, L. (2018). Beyond incentives: A qualitative analysis of factors influencing plastic buy-back program participation. *Waste Management*, 76, 67–75.

Robinson, L., et al. (2022). Integrating successful buy-back models into waste management strategies: A global perspective. *Journal of Environmental Management*, 302, 113243.

Schmidt, J. H., & Pigosso, D. C. A. (2020). The circular economy of plastic packaging: Current realities and future visions. *Resources, Conservation and Recycling*, 155, 104626.

Schmidt, S., et al. (2016). Evaluation of the bottle deposit system in Germany. *Waste Management*, 55, 34–41.

Schultz, P. W. (2014). Strategies for promoting pro-environmental behavior: Lots of tools but few instructions. *European Psychologist*, 19(2), 107–117.

Silva, R., & Santos, L. (2017). A buy-back program targeting low-income communities: The case

of Curitiba, Brazil. Waste Management, 63, 369–377.

Smith, A. (2018). Plastic recycling buy-back programs: A review of the literature. *Resources, Conservation and Recycling*, 132, 308–318.

Smith, A. (2019). Behavioral economics and the effectiveness of incentives in plastic recycling buy-back programs. *Resources, Conservation and Recycling*, 142, 231–239.

Smith, A. (2020). Community-based plastic recycling buy-back programs: A case study approach. *Waste Management*, 107, 157–166.

Solaja M.O, Awobona, S., Osifo KO (2023b) Unveiling environmental governance and political economy dynamics in rural plastic pollution management: a case study of Ogun State, Nigeria. *Reality of Politics*, 25: 74-113

Solaja, O. M., Awobona, S., & Omodehin, A. O. (2020). Knowledge and practice of recycled plastic bottles (RPB) built homes for sustainable community-based housing projects in Nigeria Knowledge and practice of recycled plastic bottles (RPB) built homes for sustainable community-based housing projects in. *Cogent Social Sciences*, 6(1), 0–20.

Solaja, O. M., Omodehin, O. A., & Awobona, S. (2023a). Socio-ecologies of Plastic Bottle Waste (PBW) and the Development of Ecoprenuerial Initiatives in Contemporary Nigerian Society. *Labor E Engenho*, *17*(00), e023006.

Steg, L. (2016). Values, norms, and intrinsic motivation to act pro-environmentally. *Annual Review of Environment and Resources*, 41, 277–292.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behavior: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.

Thøgersen, J. (2006). Norms for environmentally responsible behaviour: An extended taxonomy. *Journal of Environmental Psychology*, 26(4), 247–261.

Thompson, R. C., Moore, C. J., vom Saal, F. S., & Swan, S. H. (2009). Plastics, the environment and human health: current consensus and future trends. Philosophical Transactions of the Royal Society B: *Biological Sciences*, 364(1526), 2153–2166.

Wang, H., et al. (2018). An integrated waste disposal fee system: Lessons from the Taiwanese experience. *Waste Management*, 71, 225–233.

Waste Disposal Fee System. (n.d.). Environmental Protection Administration, Taiwan. https://www.epa.gov.tw/en/BD9161B22A09A6B8

Wilson, D. C., & Jones, P. T. (2019). Municipal solid waste management in low-income countries: Balancing development and the environment. *Waste Management*, 89, 52–62.

Wilson, D. C., & Swyngedouw, N. (2014). An overview of the challenges and trade-offs in municipal solid waste management in the Global South. *Habitat International*, 42, 224–232.

Wilson, D. C., et al. (2017). The role of waste-pickers in solid waste management in Africa: A case study of Nairobi. *Sustainability*, 9(4), 1–20.

Wright, S. L., & Kelly, F. J. (2017). Plastic and human health: A micro issue? *Environmental Science & Technology*, 51(12), 6634–6647.