



Roles of waste management in Juba city, South Sudan

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Abstract

Juba City, the capital of South Sudan, is experiencing a severe waste management crisis fueled by rapid urbanization, population growth, and weak infrastructure. This study uses secondary data to assess the composition, collection practices, and impacts of waste in Juba. Findings show that only 2.6% of the city's waste is properly managed, with organic and plastic waste comprising the largest share. Poor disposal practices, including open dumping and burning, have led to environmental degradation, blocked drainage, and rising health risks such as cholera and respiratory infections. The study highlights the need for policy enforcement, improved infrastructure, recycling initiatives, and community awareness to promote sustainable waste management and urban resilience.

Keywords: Waste management, environmental pollution, public health, urbanization, solid waste, recycling, 3Rs (Reduce, Reuse, Recycle), sustainable development

Introduction

Juba, the capital of South Sudan, is currently grappling with a growing waste management crisis driven by rapid urbanization, population growth, and conflict-induced displacement. The city generates approximately 1,337 tons of solid waste each day, yet only about 34.3 tons—or 2.6%—is collected and properly managed (Japan International Cooperation Agency [JICA], 2012). This leaves the vast majority of waste uncollected, contributing to serious environmental degradation and public health concerns.

The composition of Juba's waste stream is predominantly organic, with organic matter such as food scraps, vegetable peels, and garden waste accounting for 43.13% of the total waste. Plastic waste, including plastic bags, bottles, and packaging materials, represents another significant portion at 32.75%. Glass and metal waste—comprising items like broken glass, cans, and scrap metal—make up around 10%, while hazardous waste, such as medical and electronic waste, accounts for approximately 5%. The remaining 9.12% consists of other waste materials, including textiles, paper, and general household refuse (Ayueny, 2022) ^[1].

The absence of an effective waste collection and disposal system in Juba has led to widespread illegal dumping of waste along riverbanks, roadsides, streambeds, and open areas, as well as frequent open-air burning. These practices significantly contribute to environmental degradation and pose serious respiratory health risks to the population (Japan International Cooperation Agency [JICA], 2012). Additionally, with an estimated per capita waste generation rate of 0.65 kilograms per person per day, the already overstretched waste management infrastructure continues to face mounting pressure (Ayueny, 2022) ^[1].

Addressing Juba's worsening waste crisis requires urgent improvements in waste collection services, the establishment of waste transfer stations, proper landfills, and large-scale recycling efforts. Transfer stations could significantly enhance transportation efficiency and reduce illegal dumping, fostering a healthier urban environment. However, waste collection in the city remains inadequate in both coverage and frequency, with limited infrastructure for

transportation and disposal (World Bank, 2017). These challenges are intensified by rapid urban growth, as Juba's population has surged from 372,413 in 2008 to approximately 690,918 in 2021 (Sudan Population and Housing Census, 2008; South Sudan Population Estimation Survey, 2021; World Bank, 2013).

Historically, waste has been managed through open dumping and burning, with no formal system for segregation or sanitary landfilling. Heavily populated areas such as Konyo Konyo Market, Custom Market, and neighborhoods like Gudele and Munuki face the brunt of unmanaged waste and blocked drainage, heightening flood and health risks during rainy seasons. The lack of public awareness on waste reduction, reuse, and recycling (3Rs) further undermines sustainable practices (World Bank, 2017).

Rationale of the Study

Effective waste management is vital for promoting environmental sustainability, public health, and urban resilience, yet Juba City in South Sudan continues to face critical challenges in this area. Inadequate waste disposal contributes to severe land, water, and air pollution, undermining ecosystems and threatening biodiversity (United Nations Environment Programme [UNEP], 2018). The accumulation of uncollected waste in residential areas fosters unsanitary conditions that heighten the risk of diseases such as cholera, malaria, and typhoid, while blocked drainage during the rainy season intensifies flooding risks. Open dumping and burning not only degrade the environment but also expose residents to harmful pollutants. Despite efforts by local authorities, persistent issues such as poor infrastructure, weak governance, and lack of funding hinder progress. The absence of sanitary landfills and formal recycling systems forces residents to rely on informal and harmful disposal methods (Global Waste Management Outlook, 2015). This study aims to assess the environmental, health, and economic impacts of Juba's waste management crisis and propose sustainable, long-term interventions to mitigate these challenges and enhance urban well-being.

Purpose of studies

This study aims to assess waste management in Juba City, identify related environmental and health risks, evaluate existing policies, and explore public involvement. It also seeks to propose sustainable solutions, including 3R strategies, to improve waste management and urban health.

Significance of the studies

This study highlights Juba’s urgent waste management crisis, providing evidence-based insights to guide policymakers and stakeholders in developing effective environmental and health interventions.

Materials and methods

This study employs a qualitative research design based on secondary data analysis to explore waste management challenges in Juba, South Sudan. Due to travel constraints, data were obtained through a comprehensive review of government reports, international organization publications (e.g., UNEP, UN-Habitat, World Bank), academic journals, case studies, and media articles. These sources provided diverse insights into policy gaps, environmental impacts, and public health concerns. The study focuses on key areas such as commercial hubs (e.g., Konyo Konyo Market), informal dumping sites (e.g., Gudele and Jebel Kujur), residential outskirts, and the polluted banks of the Nile River. The data were thematically analyzed to identify recurring patterns, key challenges, and opportunities for sustainable waste management interventions in the city.

Results

Table 1: Waste composition in Juba

Waste type	In Percentage %
Organic waste	43.13%
Plastic waste	32.75%
Metal and Glass	10%
Hazardous wate	5%
other	9.12%

The analysis reveals that Juba City faces a severe waste management crisis characterized by high volumes of organic and plastic waste, limited waste collection, and widespread illegal dumping. Poor disposal practices—especially in markets and residential areas—have led to blocked drainage, flooding, and increased exposure to pollutants, contributing to public health issues such as respiratory infections and waterborne diseases. Hazardous waste and recyclable materials like metal and glass are often mismanaged, posing additional environmental risks. These challenges not only threaten environmental and human health but also undermine urban aesthetics, economic activity, and sustainable development, highlighting the urgent need for an integrated waste management strategy in Juba.

Conclusion

Juba is facing a serious waste management crisis driven by rapid urban growth, poor collection systems, and inadequate disposal infrastructure. These challenges have led to widespread pollution and growing public health risks. Weak policy enforcement, limited funding, and low public awareness worsen the situation. Urgent, coordinated action

is needed to prevent further environmental and health deterioration.

Recommendations

To address Juba’s waste crisis, the government should enforce waste management policies, establish a dedicated authority, and invest in essential infrastructure such as sanitary landfills, transfer stations, and collection systems. Promoting recycling, composting, and waste-to-energy solutions can reduce landfill pressure and create jobs. Public awareness campaigns and community involvement are key to encouraging responsible waste practices. Lastly, mobilizing international funding and partnering with private sectors can enhance technical capacity and ensure sustainable waste management.

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