

Creating Sustainable Solid Waste Management Practices, An Analysis of the Proposed Solid Waste Management Solutions for Eldoret City, Kenya

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The 20th century saw a radical shift in population dynamics, with rural-to-urban migration transforming small towns into mega cities. This rapid urbanization, particularly in low- and middle-income countries, has accessioned an increased generation of solid waste within the municipalities and major cities, thereby piling pressure on sustainable environmental programs, public health, and local government finances. Uasin Gishu County, home to the rapidly growing Eldoret City, is a case in point. Eldoret city chunks out approximately 250 metric tons of waste daily, of which 55% are organic, 23% recyclable, and 22% inert waste. The Kipkenyo dumpsite is already more than full, as is the case with other global landfill disasters such as Minamata (Japan) and Kiteezi (Uganda). Projections indicate a 220% volume growth in waste by 2044. Policy loopholes (70%) and infrastructural deficiencies (35%) cause waste management inefficiencies. This study proposes an integrated investment scheme of \$12.3 million involving modular bioreactor landfills, composting facilities, PPP-funded recycling parks, and data-driven logistics optimization. Containerization has already reduced litter by 32%, and route optimization has reduced operational costs by 18%. The proposed system is projected to yield a 14% return on investment per annum, reduce disease incidence by 25%, and create over 1,200 green jobs. Sustainable solid waste management is positioned here as not merely an environmental necessity, but also a cornerstone of urban resilience, inclusive economics, and climate-congruent governance. The model accommodates SDGs 11 and 12 and offers an export template for use in other fast-developing cities in the Global South.

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