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Improving solid waste management practices to reduce health risks in Nairobi and Mombasa

Globally, urbanisation is associated with the increased generation of solid waste. City authorities are struggling to provide adequate waste management services, especially in developing countries. In Kenya, approximately 50 per cent of solid waste generated daily in Nairobi is disposed of unsafely. Poor solid waste management (SWM) has negative health impacts, including the proliferation of infectious and non-communicable diseases. It also contributes to environmental degradation and greenhouse gas emissions. A research study carried out in Nairobi and Mombasa revealed high variability in SWM practices, from storage to collection, transport and disposal. Residents of both cities who participated in the study reported high levels of awareness about health risks associated with poor SWM, yet limited awareness of waste reduction, reuse and recycling. The findings set out policy implications for integrated SWM.

For the first time in human history, a greater number of people worldwide live in urban centres than in rural areas. This growth in the global urban population has been accompanied by a rise in the quantities of solid waste produced in these areas. The estimated total of municipal solid waste generated globally ranges from 1.7 to 1.9 billion metric tons annually.¹ In many cases, municipal authorities cannot cope with the accelerated growth in waste generation. This problem is especially challenging in developing countries where only about 30 per cent of waste from urban areas is collected and disposed of appropriately.²

Kenya is no exception to global urbanisation trends. In 2009, approximately one in three Kenyans lived in an urban centre. By 2030, the proportion will rise to one in two. Quantities of solid waste generated are expected to double by 2030 from the current level of four million

tons annually. Unfortunately improvements in solid waste management have not kept pace with the growth in urban population and quantities of solid waste produced. Approximately 1,500 tons (50 per cent) of the solid waste generated daily in Kenya's capital city, Nairobi, is not collected,³ which translates into widespread unsafe disposal.

Slums have become a characteristic feature of urban areas in developing countries. In 2010, six in ten residents of urban areas in Africa lived in slums.⁴ Slum areas receive very limited basic services such as provision of clean water, adequate sanitation and waste management. They are also often located in marginal land parcels such as next to dumpsites and landfills or flood prone areas. These factors combine to affect the health and wellbeing of slum residents as they are exposed to higher health risks in their surrounding environment.

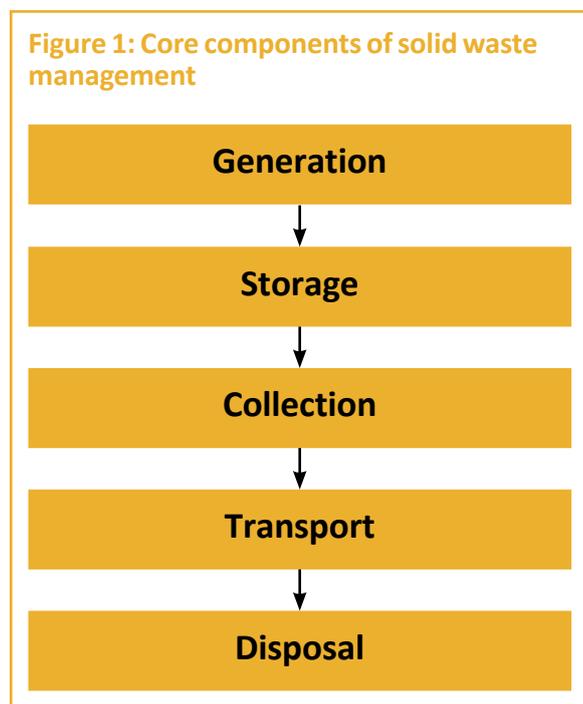
Policy Pointers

Measures that city authorities can take to reduce health and environmental risks from poor solid waste management include:

- Adopting health- and environmentally-friendly waste disposal practices
- Encouraging higher uptake of waste reduction, reuse and recycling
- Strengthening coordination and regulation of community and private sector players
- Implementing a truly integrated approach to solid waste management

Risks arising from poor solid waste management

Solid waste management involves five key components:



In many cases, stakeholders along these different components vary, which calls for an integrated approach if solid waste management is to be effective and efficient. Such an integrated approach considers how to manage solid waste in ways that effectively protect human health and the environment.

Poor solid waste management is linked to a wide range of risks including slowing down of economic growth, higher incidence of diseases, environmental degradation and deterioration in quality of life. Health impacts from improper waste management are categorised as follows:⁵

- i) Infection transmission – this could be bacterial, viral or other disease-causing organisms
- ii) Physical bodily injury – includes cuts, blunt trauma, chemical injury or burns
- iii) Non-communicable diseases – long-term exposure to toxic wastes may lead to development of cancers and other permanent, irreversible damage
- iv) Emotional and psychological effects from living in close proximity to an environmentally degraded site.

In addition to the negative effects on human health, the release of emissions from decomposition and burning of solid waste also contributes to accumulation of atmospheric greenhouse gases and exacerbation of climate change.

Assessing solid waste management practices in Nairobi and Mombasa

To better understand the health and environmental impacts of poor solid waste management in Kenya, the African Population and Health Research Center (APHRC) undertook a research project in the cities of Nairobi and Mombasa, as part of the Urban Africa: Risk Knowledge (Urban ARK) programme. The study focused on solid waste management practices in the two cities and the associated health and environmental impacts of these practices.

APHRC researchers conducted a representative survey of 1,165 households in Nairobi and another 1,225 households in Mombasa, across a range of slum and non-slum communities. The study examined SWM practices, such as storage, collection, recycling, and disposal. Key results are summarised in Table 1.

Table 1 : Household SWM practices in Nairobi and Mombasa

Practice	Nairobi	Mombasa
Storage		
Use plastic bags	85	52
Collection		
4-6 times monthly	92	49
Collection service provider		
Community-based organisation	62	51
Disposal		
Burning	19	47
Recycling	5	5

Household SWM practices in Nairobi and Mombasa

Collection services in Mombasa were about half as frequent as those reported in Nairobi. This may explain the higher level of burning reported in Mombasa. In both cities, municipal authorities have largely withdrawn from collection services, and the sector is now dominated by private sector players and community-based organisations (CBOs). Not surprisingly, residents of slum areas in both Nairobi and Mombasa reported lower rates of waste collection, likely due to an inability to pay for services. Though a considerable proportion of respondents were aware of recycling and composting, very few reported using these methods of waste disposal.

A quarter of the waste produced in Nairobi is disposed of at the municipal dumpsite in Dandora. The dumpsite is an open landfill next to residential areas and receives all types of waste, including household, agricultural, industrial, and medical.

Over 250,000 people live adjacent to the dumpsite, exposing them to a range of health risks. In close proximity to the dumpsite is the Nairobi River, which is used to irrigate food crops that are later sold in the city. This further heightens the potential for human exposure to harmful toxins stemming from poor solid waste management.

Perceptions of health and environmental risks

The study further examined perceptions of community members around exposure to solid waste and the associated health risks. Findings revealed that if community members perceive the risks posed to their health, they are likely to change their behaviour and reduce their exposure to harmful solid waste practices. The study revealed that the majority of community members in both cities understood the risks associated with poor solid waste management. Table 2 shows the most commonly cited risks mentioned by the survey respondents.

Table 2: Commonly cited risks of poor SWM

	Nairobi (%)	Mombasa (%)
Health risks	87	99
Dirty environment	52	69
Air pollution	55	53

Some 28 per cent of respondents in Nairobi and 14 per cent in Mombasa reported that they or a household member had experienced a health issue related to poor solid waste management. The most commonly reported illnesses for which respondents had sought medical attention were diarrheal diseases, respiratory conditions, malaria, and allergies. Despite high awareness about health risks, over 60 per cent of respondents in both Nairobi and Mombasa reported that they and other community members were not doing anything to address these risks. Reasons for their inaction included inadequate resources, lack of government support, poor coordination, and insufficient knowledge.

Policy implications

Poor solid waste management is widely known to pose health and environmental risks. Policy makers understand this and city residents, especially those from slum areas, face this reality daily. Improper solid waste management is a visible problem and municipal authorities are often judged on the basis of their ability to deliver effective services in this sector. As urbanisation trends continue, the increase in waste generation calls for the utilisation of even greater resources by often over-stretched municipal authorities.

In light of these growing challenges, several policy implications for integrated solid waste management

“Findings revealed that if community members perceive the risks posed to their health, they are likely to change their behaviour and reduce their exposure to harmful solid waste practices.”

can be drawn from the research conducted in Nairobi and Mombasa.

Adopt healthy and environmentally-friendly disposal practices

The siting and accessibility of municipal dumpsites is a core component of a city’s solid waste management system. Nairobi’s massive Dandora dumpsite is overflowing and is no longer viable. Its continued use increases the accumulation of hazardous toxins and heightens the health risks for people who work at the dumpsite and those living in surrounding slums and neighbourhoods.

Specific actions that the city authorities can take include a shift away from open dumpsites to safely managed landfills that incorporate the use of appropriate technology to safely maximise use of waste materials. For instance, energy can be generated from waste incineration or biogas harvesting on site. Stakeholders interviewed in Nairobi indicated that county staff have already received training in safe approaches to waste disposal, however the government has not yet allocated sufficient resources for its full implementation.

Encourage reduction, reuse and recycling

The study revealed that while there was some awareness among community members about waste reduction, reuse and recycling, this did not translate into practice. This highlights the need for awareness campaigns on integrated waste management which incorporate measures such as waste reduction, recycling and composting to maximise efficiencies and societal benefits. For this to work well, households should be encouraged to embrace waste separation at source which reduces the costs of segregating waste materials later. Once the waste is separated at source, the differentiation should be maintained during transport and disposal in safely managed dumpsites.

To achieve this, awareness campaigns can be carried out in partnership with community and non-governmental organisations to effectively reach households and individuals. These campaigns should also communicate the economic benefits that can be realised through reduction, reuse, and recycling practices. For instance, community organisations can generate income from selling

compost to farmers or reselling plastic materials to manufacturers. Such activities can boost the incomes for residents of slums and other low-income neighbourhoods.

Strengthen coordination and regulation of community and private sector players

CBOs and the private sector play a vital role in the provision of services along the solid waste management chain. As public sector participation has declined over time, alternative service providers have stepped in to fill the gap. Our study revealed that city authorities provide collection services to less than one per cent of households in both Mombasa and Nairobi. This has implications on collection rates, especially in low-income neighbourhoods where households cannot afford private collection services. City authorities need to consider how they can effectively work with and support co-ordination between these CBOs and firms to ensure that all neighbourhoods – including slums – receive collection services.

Private sector players and CBOs must be monitored by government to ensure they operate within the regulatory framework and meet health and environmental requirements across the solid waste management chain. For instance, they should use the appropriate trucks, and workers should wear protective

gear when transporting waste. They should also dispose of waste in the sites allocated by city authorities and not resort to dumping on roadsides or in rivers. While private sector actors and CBOs have a role to play in introducing SWM innovations, they must be held fully accountable to ensure they promote health and environmental protection.

Implement a truly integrated approach to solid waste management

Municipal authorities in Kenya have tended to spend disproportionately larger amounts on solid waste collection compared to transport and disposal. This can be attributed to the visibility of the problem – uncollected garbage is a visual nuisance that city residents can point to as a failure by municipal government. The emphasis on collection, comes at the expense of the other steps in the solid waste management chain. A truly integrated approach to solid waste management would allocate resources equitably across this chain. In practice, this would see increased resources allocated to raising awareness on reduction of waste generation; provision and use of appropriate storage that would also ease recycling; collection at regular intervals including in low-income neighbourhoods; proper transport and handling in line with regulations; and, disposal and treatment at designated landfills that are safely managed.

This briefing is based on Amugsi, D, Haregu, T, Mberu, B, Muindi, K and Ziraba, A (2017) *Solid Waste Management and Risks to Health in Urban Africa: A Study of Nairobi and Mombasa Cities in Kenya*. APHRC, Nairobi.

Authors

Blessing U. Mberu, PhD, Senior Research Scientist and Head of Urbanization and Wellbeing Unit, APHRC. bmberu@aphrc.org
Mwangi Chege, Policy Engagement Manager, APHRC

The African Population and Health Research Center (APHRC) is an African-led institution committed to generating evidence to inform decision making on the most critical challenges facing the continent. Based in Nairobi, Kenya, APHRC works across sub-Saharan Africa through three integrated programmatic divisions: research which emphasises health and wellbeing; research capacity strengthening to deepen the skills of African scholars; and policy engagement and communications to support greater uptake of evidence in policy and decision making in Africa.

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Urban Africa: Risk Knowledge (Urban ARK)

breaking cycles of risk accumulation in sub-Saharan Africa

A three-year programme of research and capacity building that seeks to open up an applied research and policy agenda for risk management in urban sub-Saharan Africa. Urban ARK is led by 12 policy and academic organisations* from across sub-Saharan Africa with international partnerships in the United Kingdom.

* Abdou Moumouni University; African Population and Health Research Centre; Arup; International Alert; International Institute for Environment and Development; King's College London; Mzuzu University; Save the Children; UN-Habitat; University of Cape Town; University College London; University of Ibadan

Contact: Mark Pelling
mark.pelling@kcl.ac.uk



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