Solid Waste Management in Lebanon's Displacement Centers: Towards Sustainable Solutions

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Executive Summary

Lebanon faces a significant waste management crisis, particularly in displacement centers, where inadequate solid waste management [2] (SWM) systems exacerbate public health and environmental challenges. The Lebanese SWM system, already weakened by governance failures and economic instability, struggles to address the growing waste volumes due to the influx of displaced populations, including refugees and internally displaced persons. This policy brief highlights the urgent need for effective SWM strategies in Lebanon's displacement centers, focusing on the challenges waste poses to both displaced and local communities, and offering actionable solutions to enhance SWM and protect public health.

Key Findings

- **Health Risks**: Uncontrolled waste leads to disease outbreaks.
- **Environmental Damage**: Air, water, and soil pollution from improper solid waste disposal.
- **Economic Constraints**: Lebanon's financial crisis limits SWM capacity, leading to waste accumulation and reliance on temporary NGO interventions.

Key Recommendations

- **Coordination and Stakeholder Engagement**: Improve collaboration between key actors and involve displaced communities in waste management.
- **Localized and Mobile Solutions**: Set up waste collection hubs and mobile units in informal settlements.
- **Simplified Waste Practices**: Implement basic waste segregation and low-cost solutions.
- **Health and Hygiene**: Integrate waste disposal with health measures to prevent disease spread.
- **Sustainability and Resource Utilization**: Promote reusable materials and waste-to-resource initiatives.
- **Government Long-Term Planning**: Develop a SWM strategy tailored to displacement settings and crisis situations.

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[2] The systematic process of collecting, transporting, treating, and disposing of solid waste. It aims to minimize environmental and health impacts while promoting resource recovery, recycling, and sustainable waste reduction practices.

Introduction

Lebanon has long struggled to manage the needs of over 1.5 million Syrian refugees alongside its vulnerable populations living in displacement centers and informal settlements (UNHCR, 2023). The situation worsened in 2024, as the Israeli war on Lebanon triggered the internal displacement of over 1.2 million people, further straining Lebanon's already crumbling infrastructure (UNHCR, 2024a). Displacement centers, overcrowded, faced mounting challenges in solid waste management (SWM), unsegregated waste accumulated unchecked. This mismanagement worsened public health risks, including disease outbreaks, while it contributed also to severe environmental degradation and declining living conditions (WHO, 2013). These challenges were compounded by Lebanon's national waste system, which has suffered from systemic governance failures, weak enforcement, and inadequate resources for decades.

Lebanon's national SWM strategy faces systemic deficiencies, worsened by ongoing economic and political instability. Solid waste refers to discarded materials produced from various human activities, including organic matter, plastics, paper, and other materials (Oxfam, 2008). These deficiencies, characterized by limited municipal resources and weak governance, have stalled reforms aimed at effectively managing waste disposal and recovery systems (Farah et al., 2019).

In displacement settings, where large populations of internally displaced people and refugees live in precarious conditions, challenges become even more severe. Waste accumulates unchecked, with informal recycling networks operating unsafely and infrastructure deficits compounding environmental and public health risks (Oxfam, 2008). Despite Lebanon's international commitments to protecting displaced populations, including adherence to guidelines established by organizations such as UNHCR, significant gaps persist in addressing risks associated with waste management and ensuring dignified living conditions that mitigate environmental hazards (UNHCR, 2024b).

This policy brief underscores the urgent need for SWM solutions in Lebanon's displacement centers. It examines the critical challenges obstructing effective waste management and proposes practical, community-focused, and municipal strategies to mitigate public health risks, improve living standards, and address Lebanon's obligations under the Sustainable Development Goals (SDGs), particularly SDG 11 on sustainable cities and communities, and SDG 12 on responsible consumption and production.

Research Approach

The study adopted a qualitative approach, utilizing interviews to investigate waste management challenges in Lebanon's displacement centers. The interviews were conducted on January 2, 2025. Participants included a volunteer with firsthand experience in these centers, a director of a school turned into a displacement center, and municipal personnel from a village in Chouf that hosted a significant influx of displaced individuals following the 2024 conflict. These interviews offered valuable insights into waste collection practices, infrastructure challenges, and the social dynamics surrounding waste management in these settings. To complement these findings, secondary data, such as UNHCR reports and examples of best international practices in waste management, were analyzed to provide context and inform practical solutions.

Core Challenges

Displacement centers worldwide, including those in Lebanon, face critical challenges stemming from inadequate SWM systems. Refugee camps frequently lack structured waste collection and disposal infrastructure, forcing displaced and host communities to resort to uncontrolled dumping. This issue is not merely a secondary concern in displacement settings; rather, it is a fundamental necessity with direct implications for public health, environmental sustainability, and social stability,

affecting both displaced populations and host communities alike.

Social Challenges

- **Health Risks**: Ineffective waste management in displacement centers creates significant health hazards. Uncontrolled dumping and burning of waste attract disease vectors such as flies, mosquitoes, and rats, increasing the prevalence of diseases like malaria, dengue, and typhoid (WHO, 2013; Oxfam, 2008). Interviewees emphasized particular concerns, such as the accumulation of waste over extended periods (Volunteer & School Director, personal communication, January 2, 2025) and the improper disposal of items like diapers (Volunteer, personal communication, January 2, 2025). The accumulation of waste overtime and improper disposal are key factors that exacerbate health risks within displacement settings.
- **Community Demoralization**: The visible buildup of waste and accompanying odors contribute to psychological distress among displaced populations already facing trauma (WHO, 2013). One volunteer described how unmanaged waste became widespread until a meeting with displaced residents was held to implement measures improving sanitation and health conditions (Volunteer, personal communication, January 2, 2025). Municipal personnel noted that the displaced population in their village nearly equaled the local community, causing strain on infrastructure and exacerbating waste management issues (Municipal Personnel, personal communication, January 2, 2025). This strain on infrastructure and the challenges of unmanaged waste contribute to community demoralization, as residents face increasingly unsustainable living conditions and diminished morale.

Environmental Challenges

- **Air Pollution**: Open burning of waste, particularly plastics, releases toxic gases contributing to air pollution and respiratory health problems (Oxfam, 2008; WHO, 2013).
- **Water Contamination**: Leachate from waste piles, often dumped near or above water tables, contaminates groundwater and other drinking water sources, impacting both displaced and host communities (Oxfam, 2008).
- **Soil Degradation:** Unmanaged disposal of waste, particularly in displacement settings, leads to significant soil contamination. These pollutants degrade soil fertility, making the land unsuitable for agriculture or habitat restoration (Mihai et al., 2022).
- **Biodiversity Loss**: Unmanaged waste encroaching on natural habitats threatens local flora and fauna, undermining ecosystem resilience (World Bank, 2024).

Economic Challenges

- **Resource Limitations**: Lebanon's ongoing economic crisis has severely weakened SWM systems, with only 6.8% of the country's waste treatment capacity currently operational due to financial constraints (World Bank, 2024). Interviewees noted that limited funding left municipalities unable to provide essentials like plastic bags, with the primary focus directed toward food and other immediate necessities (Volunteer, School Director, & Municipal Personnel, personal communication, January 2, 2025).
- **High Waste Volumes**: High waste volumes present significant challenges for proper disposal and sustainable SWM in displacement settings. Interviewees highlighted the significant increase in waste volumes, with food waste comprising a large portion (Volunteer, personal communication, January 2, 2025), and daily solid waste in a Chouf village rise dramatically from 20 tons to 60 tons (Municipal Personnel, personal communication, January 2, 2025).
- **Cost of Emergency Interventions**: Reliance on international organizations and NGOs for

temporary SWM solutions adds to the financial strain and hinders the development of sustainable long-term strategies (Oxfam, 2008). Municipal personnel highlighted the lack of funding from national or international bodies for waste management, as most resources were directed toward food and clothing (Municipal Personnel, personal communication, January 2, 2025).

Assessment of Existing Policy Options and Solutions

- **Decentralized Waste Management Systems:** Decentralization is a cornerstone of recent SWM policies in Lebanon, promoted as a response to the failures of centralized systems, including the over-reliance on facilities like the Naameh landfill, which was closed in 2015 (Farah et al., 2019). Several municipalities have begun implementing localized waste systems, including small-scale composting and recycling programs. However, these initiatives are largely underfunded and lack scalability, especially in displacement settings where infrastructure constraints are more extreme.
- **Public-Private Partnerships (PPPs):** PPPs have emerged as an effective model in Lebanon to address gaps in SWM implementation. A noteworthy example is the Beit Mery municipality's partnership with a local enterprise, which has successfully created an independent and environmentally sustainable waste management system (Giannozzi, 2018). This project is especially relevant for displacement settings as it demonstrates how local authorities can work with private actors to bypass state-level inefficiencies and develop localized solutions. Yet, such models have not been systematically applied to informal settlements or camps hosting displaced populations.
- **Integrated Solid Waste Management (ISWM) Law (Law 80/2018):** Law 80/2018 provides a national framework for ISWM, focusing on waste reduction, recycling, and resource recovery. While this policy has officially been adopted, its implementation in displacement settings is limited due to weak enforcement mechanisms and fragmented local governance (World Bank, 2024). Displaced populations in camps and informal settlements often fall outside the scope of municipal waste management systems, forcing reliance on other solutions.
- **Community Involvement:** Community involvement played a crucial role in addressing waste management challenges in displacement settings. During a meeting with displaced individuals at the center, the participants were highly engaged and actively contributed to finding solutions for waste disposal, showcasing their willingness to address local environmental issues (Volunteer, personal communication, January 2, 2025). Additionally, the municipality supported these efforts by mobilizing private trucks from villagers to help transport waste, alleviating pressure on public infrastructure (Municipal Personnel, personal communication, January 2, 2025). This collaborative approach highlights the importance of community-driven solutions in managing waste effectively, particularly in displacement centers where resources are limited.

Governance and Policy Gaps

Key governance challenges include:

- **Resource Constraints**: Municipalities in Lebanon face severe financial limitations and inadequate waste management infrastructure. As a result, waste removal is often delayed, with municipalities struggling to address waste efficiently due to a lack of resources. All interviewers highlighted that waste removal took a long time, and the municipalities did not have the necessary resources to manage the waste in a timely and effective manner (Volunteer, School Director, & Municipal Personnel, personal communication, January 2, 2025).
- **No Clear SWM Implementation Plan**: There was a lack of clear SWM plan to address the

waste generated in displacement centers. As noted by an interviewee, no formal plan was initially in place, but over time, efforts were made to implement measures to manage solid waste (Volunteer, personal communication, January 2, 2025). According to municipal personnel, waste management became one of the most pressing challenges, one that was not anticipated but ended up causing significant issues for both local and displaced populations, leading to uncalculated costs for the municipality during the displacement period (Municipal Personnel, personal communication, January 2, 2025).

- **Policy Inefficiencies**: Despite the adoption of Law 80/2018 for ISWM, significant gaps remain in its implementation. These include the absence of a National SWM Authority and weak enforcement mechanisms, which hinder effective policy execution (World Bank, 2024). Additionally, municipalities in Mount Lebanon and Beirut lack their own SWM strategies and instead rely on private companies like City Blue for waste management services (Municipal Personnel, personal communication, January 2, 2025). This reliance on external actors further complicates the consistent and efficient handling of waste, especially in displacement settings.

Stakeholders

- **Displaced Populations:** Most affected by poor waste management, facing health risks from unsanitary conditions.
- **Host Communities:** Impacted by environmental degradation and pollution from unmanaged waste.
- **Government Entities:** Responsible for waste management but face financial and administrative challenges.
- **NGOs and International Agencies:** Provide technical and financial support but are constrained by limited resources.
- **Private Sector and Informal Workers:** Contribute to waste management but require formal integration for safety and support.

Policy Recommendations

These recommendations serve as preventive measures and actionable responses during crises, ensuring that waste management remains feasible even in challenging contexts like Lebanon.

- **Strengthen Coordination Between Key Actors**: The government, municipalities, NGOs, and the private sector must enhance coordination to prevent waste accumulation in displacement centers. Leveraging existing waste collection services and informal waste collectors should be prioritized.
- **Include Displaced Communities in Waste Management Decision-Making**: NGOs and municipalities should directly engage displaced communities in planning waste management strategies, ensuring practical and culturally appropriate solutions that align with their needs.
- **Establish Localized Waste Management Systems**: The Ministry of Environment, in collaboration with municipalities and NGOs, should set up decentralized waste collection and sorting hubs in displacement areas. These hubs should integrate informal waste collectors and promote community-led recycling and composting where feasible.
- **Deploy Mobile Waste Collection Points**: Given the mobility challenges in informal settlements, NGOs and municipalities should implement mobile waste collection units that visit displacement areas on a scheduled basis to prevent waste accumulation.
- **Implement Simple Waste Sorting Practices**: NGOs and local authorities should introduce basic waste segregation for organic and non-organic waste in displacement centers. Given the lack of infrastructure, focus should be on easily

implementable, low-cost methods that prevent cross-contamination.

- **Raise Awareness on Sustainable Waste Practices**: Community leaders, NGOs, and local municipalities should run awareness campaigns on waste reduction and practical recycling methods that work within Lebanon's current context. Messaging should be adapted to crises, focusing on low-waste behaviors and minimizing plastic dependency.
- **Encourage the Use of Reusable and Locally Available Materials**: NGOs and humanitarian organizations should distribute reusable bags, containers, and other sustainable alternatives where possible, ensuring that solutions are accessible and practical for displaced populations.
- **Utilize Waste as a Resource for Immediate Needs**: Volunteers in displacement centers should promote small-scale waste-to-resource initiatives, such as repurposing plastic bottles into containers for essential items like detergents, dish soap, and shampoo, helping to reduce waste.
- **Integrate Health and Hygiene Measures into Waste Management**: Waste disposal methods should align with health protection strategies to mitigate the spread of disease in overcrowded settings. The Ministry of Public Health and humanitarian organizations should oversee this integration.
- **Develop Emergency Waste Management Plans**: The Ministry of Environment, in coordination with relief agencies, should establish scalable emergency waste management protocols for rapid deployment in conflict or disaster situations. These should focus on essential waste collection and disease prevention measures.
- **Empower Informal Waste Collectors**: Local municipalities and NGOs should provide safety measures, training, and recognition for informal waste collectors who play a crucial role in Lebanon's waste system, ensuring fair treatment and security during crises.
- **Enhance Data Collection on Waste Generation and Management**: Given limited resources, simple and effective tracking systems should be implemented by municipalities and NGOs to monitor waste trends and ensure transparency in relief efforts.
- **Develop a Post-Crisis Waste Management Strategy**: As communities transition to stability, the Ministry of Environment and municipalities should work on integrating displacement areas into long-term waste management plans, ensuring sustainable solutions beyond the immediate crisis.
- **Prioritize Realistic and Scalable Solutions**: Given Lebanon’s economic and political instability, recommendations should remain practical, focusing on low-cost, community-driven waste initiatives that can be maintained even with limited government support.

This approach ensures that waste management remains a priority without overburdening already strained systems, providing feasible solutions that work within Lebanon’s unique displacement and crisis context.

Conclusion

Effective waste management in Lebanon’s displacement centers is critical for safeguarding public health, preserving the environment, and improving the quality of life for displaced populations and host communities. The challenges presented by inadequate infrastructure, limited resources, and weak governance require urgent attention and collaborative solutions. Even though waste management in displacement settings might not initially appear as a fundamental issue, interviews with stakeholders and data from literature revealed that it was one of the major challenges faced, often overlooked or not adequately prepared for beforehand. By implementing decentralized waste management systems, fostering community

involvement, and creating sustainable waste-to-resource initiatives, Lebanon can improve waste management practices in these vulnerable settings. Additionally, aligning SWM strategies in displacement settings with broader national policies and securing adequate funding from international partners are crucial steps in addressing these challenges. Through these efforts, Lebanon can mitigate the environmental and health risks posed by waste accumulation in displacement settings, ultimately contributing to the achievement of the Sustainable Development Goals.

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