



# Gender Involvement in Municipal Solid Waste Management in Nigeria: A Review of Perceptions, Practices; and Challenges

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## Abstract

Solid waste management practice focused on the technical issues of waste disposal with little or no attention paid to the gender involved. Solid waste management needs women participation to be effective as gender activities play an important role in solid waste management as there is clear understanding of the perceptions of both men and women that is required in waste management. This paper review gender involvement in solid waste management in identify the specific roles, perceptions, values, attitudes, and practices of women in relation to solid waste management, as well as the issues and constraints that hinder their active participation. Studies showed that there is a relationship between women socio-economic status and solid waste management. Despite their crucial contributions; women are often relegated to the background in decision-making processes and policy implementation. The paper highlighted the importance of incorporating gender considerations into municipal solid waste management policies and practices to achieve greater equality and sustainability. Some recommendations were made to improve gender involvement in solid waste management.

**Keywords:** Solid waste management, gender, participation, perceptions, practices, challenges

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## I. Introduction

Municipal solid waste management (MSWM) is a critical issue in Nigeria, with many cities struggling to manage the increasing volumes of waste generated. Women play a vital role in waste management, particularly in informal settings where they are often the primary waste collectors and recyclers. However, their involvement is often overlooked and undervalued, leading to a lack of recognition and support for their efforts. Studies have shown that women are more involved in waste management at the household level, where they are responsible for managing household waste and maintaining sanitation facilities. However, their involvement is limited at higher levels, such as in policy-making and decision-making processes. This gender bias can lead to the failure of waste management schemes and the lack of long-term sustainability.

### 1.1 Solid Waste

Waste is any substance which constitute scrap material or other unwanted surplus substance arising from the application of a process, or any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled". On the other hand, [1] viewed waste as, "any material which has no value to the producer and must therefore be disposed of". The basic point of agreement between the two definitions is therefore on the issue of value; they both agree waste must be defined by the owner or producer of the waste. The definition by the EU Framework Directive on Waste (91/156/EEC) defines waste as "any substance or object which the holder discards or intends to discard and which falls into production or

consumption residue, product whose date for appropriate use has expired, contaminated or soiled materials and substances that no longer performs satisfactorily [2]. Generally, solid waste can be classified into three categories. They are municipal solid waste, industrial solid waste and hazardous solid waste [3].

### **1.1 Municipal solid waste (MSW)**

These are defined to include refuse from households, nonhazardous solid (not sludge or semisolid) waste from industrial and commercial establishments, and refuse from institutions (including non-pathogenic waste from hospitals), market waste, yard waste and street sweepings. Sometimes, construction and demolition debris is also included [3]. Article 2(b) of the European Union Landfill Directive [4] broadened the definition further by defining MSW as waste arising from households as well as other wastes, which because of their nature and composition are similar to waste from households [5]. This implies that MSW may often include biodegradable components such as paper, wood, textiles, food and garden waste, as well as non-degradable fractions such as glass, plastics, tyres and bottles. The various sources of these wastes in any community may include: residential houses, institutions, commercial organizations, municipal services, allotments and treatment sites [6]. In essence, MSW would normally include all wastes from the neighborhood except industrial, agricultural and hazardous wastes [7].

### **1.2 Industrial Waste**

Industrial waste is generally referred to as a material from a manufacturing process that has no value to the manufacturer and that has to be disposed of in some manner. With rising economic standards and with many imported consumer goods (particularly food items), Nigerians increasingly have access to packaged goods, often using plastics, which makes waste disposal difficult. The development and widespread use of new packaging substances such as plastics have improved the standards of living for millions, but they have also introduced new threats to the environment, as typified by the histories of dichlorodiphenyltrichloroethane (DDT) and polychlorinated bi-phenyls (PCBs). Thus, industrial development also brings in its wake problems of environmental pollution that often need abatement.

### **1.3 Hazardous Waste**

A special class of waste known as hazardous waste, mostly discharged into the environment from industrial and related sources attracts special attention and management considerations because of their harmful nature to man and other components of the ecosystem. A waste classified as hazardous waste, by definition and convention usually has one or more of the following four characteristics: ignitability, corrosively, reactivity and toxicity. These definitions show that a wide range of substances of different physical forms (liquid, gaseous, solid, or in solution) fall into the class of hazardous materials which may become waste. Hazardous wastes have been known to cause serious environmental and epidemiological disasters as a result of the lack of or inadequate handling and management of these wastes [3].

## **II. Solid Waste Generation and Disposal**

### **2.1 Waste generation**

Waste generation is primarily a function of people's consumption patterns and thus is based on their socioeconomic characteristics. Waste generation rates have been increasing rapidly due to urbanization and industrialization. As a result of population growth and urbanization in developing countries, overall volumes of waste generation is much higher than most developed countries and the industrial waste generation rates are also very high as most of the industries are primary industries producing raw materials for industrial production. Furthermore, due to improved living standards, improved healthcare and due to globalization, a number of new waste streams have emerged, especially e-waste and hazardous waste. [8] Human nature is such that waste generation cannot be avoided. The volume of waste generated is also dependent on the economic status of the people. This is buttressed by the fact that higher incomes result in increased consumption patterns and further generation of more waste.

### **2.2 Disposal Methods of Solid Waste**

It is often desirable to use an integrated approach to solid waste management that includes components of recycling, composting, incineration and land filling. All of these are often proposed as the solution. Both composting and incineration leave substantial amounts of waste that must be land filled. By far the most common method of disposal is land filling, as it is apparently the cheapest and easiest [9].

### **III. The Solid Waste Management Hierarchy**

Municipal solid waste management (MSWM) practices between countries are distinct; in most however, relevant services are rendered by the (local) government or private service providers and may be carried out by employing the hierarchy of waste management [10]. The hierarchy is regarded as one of the important foundations of contemporary MSWM systems and has been popularly adopted for the development of policies related to waste management both on regional and national level, especially in developed countries [8]. The hierarchy of waste management is defined by the 3Rs - reduce, reuse and recycle- stratifies options of waste management and focuses on maximum utilization of resources with minimum generation of resultant waste [10]. The 3Rs refer to the reduction in the amount of waste being generated, the reuse of items prior to their being commissioned as waste, and the recycling of items once they become waste. An expounded version of this in the waste management hierarchy includes- waste prevention/reduction, reuse, recycling & composting, energy recovery, and finally landfilling. The hierarchy function is to aid in the management of waste whilst ensuring little impact on the environment. In most nations, prioritization of components in the hierarchy is alike giving preference first to waste prevention, then reuse, recycling (including composting and material recovery), energy recovery and reduction of waste via methods such as incineration and finally landfilling.

#### **3.1 Waste Prevention and Reduction**

Waste Prevention occupies the topmost rung in the waste management hierarchy. It refers to the activities undergone with an item prior to being perceived as waste; these involve: decrease in the amount of waste produced via the prolongment of such item life span and its re-use; decrease in associated environmental and public health impacts from waste produced; and decrease in quantity of noxious substances contained in products [11]. The concept of waste prevention cuts across the entire process a product undergoes- right from its obtainment in raw form, its manufacture, distribution, to its utilization and end of its useful life. While prevention or minimization may not be isolated to a certain stage in any product life time, the more efforts directed at waste prevention in the earlier stages of a product lifetime, the less impact they have on the latter stages.

#### **3.2 Reuse**

Following the hierarchy, the next best option for SWM is re-use and this encompasses the utilization of an item after its initial use, either for a purpose similar to that which it was intended or for an entirely new one. This is exemplified in the reutilization of bottles (of beverages) or plastic bags from stores[12]. According to the [11], reuse refers to “any operation by which a product or its components, having reached the end of their first use, are used for the same purpose for which they were conceived, including the continued use of a product which is returned to a collection point, distributor, recycler or manufacturer, as well as reuse of a product following refurbishment;” As such, the reduction of solid waste extends to reuse as the latter slows down the entrance of an item into the waste stream, as well as prevents the amount of items that eventually become waste [11].

#### **3.3 Recycling**

MSW materials which arise following consumption may be recovered and processed into useful items, bearing in mind the cost effectiveness, marketability and environmental impact it may have [12]. The recycling process includes collection, segregation and processing of waste with productive value [13] as such inorganic fractions of MSW (paper, metal, plastic, glass materials) may be recycled[12]. Recovery of inorganic materials from MSW has been identified as a key component in the management of waste [14]. In some developed parts of the world, recycling activities have been reported to be quite high. The rates in Germany and Austria for example, go beyond 25%, with Austria being reported to have maintained composting rates of about 40% since the early 90s (EEA, 2007) and Brazil having material recovery rates as high as approximately 41%[15].

#### **3.4 Composting**

Organic components in MSW (i.e. waste of food and garden origin) are considered useful composting material [12]. Composting is a process which could decrease MSW by an average of almost 68 % of its original volume [14]. The process has been defined as the: “biological decomposition of biodegradable solid waste under controlled predominantly aerobic conditions to a state that is sufficiently stable for nuisance-free storage and handling and is satisfactorily matured for safe use in agriculture”[10]. The end product, compost, may be utilized in the conditioning of soils meant for agricultural purposes; its use in this manner gives the soil a stable nutrient source (nitrogen, potassium and phosphorus) that is gradually tapped from, and aids its water retention capacity.

### **3.5 Energy Recovery**

MSW contains organic components which are combustible. Thus, energy could be gained from incineration of waste or landfill gas combustion, which may be used to generate electric power (from steam under high thermal conditions) or produce heat for buildings (through boilers)[12]. As such, the process of converting solid waste of organic nature into other useful forms such as gas, heat, steam and ash residues via combustion is referred to as incineration and such process is carried out in places often referred to as Waste-to-Energy plants [15].

### **3.6 Landfilling**

Landfilling is the deposition of waste either in a specific land area with the goal of preventing such waste from impacting negatively on the environment [16].

## **IV. Municipal Solid Waste Collection in Nigeria**

According to [17] the collection of solid waste is the most difficult and expensive aspect of solid waste management in developing countries. As a result of the unplanned nature of most cities in Nigeria, this task can sometimes be daunting. Ineffective collection systems often lead to waste accumulation, creating nuisance and odour problems, environmental pollution, fire hazards and generally threatening the physical well-being of the populace. Survey of existing literature reveals that two primary collection methods are obtainable in Nigeria: “Door to door” and “Depot”, or community disposal, method

### **4.1 Door to Door Waste Collection**

Standard waste collection receptacles are rarely available at household level in most parts of sub-Saharan Africa [18]. In Nigeria particularly, many low and middle income households use whatever container that is readily available, such as baskets, cans, buckets, open drums and sometimes black bin bags for waste collection. As a result of the high organic and moisture contents and high prevailing temperature, waste collected in such sub-standard receptacles decay rather rapidly giving rise to undesirable environmental consequences. In contrast however, most upper income households and government offices use standard receptacles, with covers, for collection of their waste. Door to door waste collection requires good planning and management. Collection crews come on specified days to empty the bins for transfer to dumpsites and this is where gender comes into play. This system demands a minimum outlay of manpower and equipment as well as accessibility. Where these are not readily available the system readily collapses.

### **4.2 Depots/Communal Collection Facilities**

In neighborhoods where access is constrained, waste from households are brought to communal collection facilities sometimes called bring banks. Bring banks may be in the form of skips or other purpose built structures. Collection crews from the local government department or private waste management agencies come on set days to empty the facility. Bring banks are usually centrally located for easy access to the entire community and collection crews. In many cases inadequacies in design and location of bring banks compel some residents to either misuse or not to use bring bank facilities at all, where this happens fly tipping results.

## **V. Solid waste management in Ibadan, Oyo State**

Waste generation has been on the increase since 1960 in Ibadan. The rate of waste generation increased from 0.37 kg/capita/day in the late 1960s/early 1970s[19,20,&21,] to 0.55 kg/capita/day between 2012 and 2015[22;23;24;25]. In 2012, about 635,000 tons, approximately 0.55 kg/person/day quantity of waste was generated in the city [22]. [25] disaggregate the waste generated in the city of Ibadan into organic waste (accounting for 42% by weight), paper (10%), textile (2%), glass (4%), metal (5%), wood (3%) and plastics (9%). Some of the wastes are hazardous, flammable, or non-biodegradable. Without adequate provision for residential solid waste management, a diverse range of disease vectors will likely breed or feed within and around houses and residential neighbourhoods, reducing quality of life, wellbeing and hindering sustainable development [26;27;28].The responsibility for solid waste management in the city currently lies with the Oyo State Government, Ministry of Environment and Water Resources, Oyo State Solid Waste Management Authority (OYOWMA) and local governments. Each organ of government has different roles and responsibilities. In terms of waste management, OYOWMA is the statutory body established in 1997 by the state government to undertake waste collection, processing and disposal [29]. It has the direct and operational responsibility for residential solid waste management in the city. The Ministry of Environment and Water Resources performs a supervisory role over the Oyo State Solid Waste Management Authority. The Oyo State

Solid Waste Management Authority is charged with the responsibility of collecting wastes along major roads, markets, inner city areas and other areas not covered by private waste contractors. Prior to Edict No. 8 of 1997 establishing OYOWMA, municipal solid waste collection and disposal were undertaken by the Ibadan Solid Waste Management Authority. The authority was functioning under the Ibadan City Council and later when Ibadan Municipal Government was created, the responsibility was transferred to Ibadan Municipal Council. Later, Ibadan city and its environs were constitutionally divided into eleven local government areas (LGAs) to shoulder the responsibility of collecting, transporting and disposing of municipal solid wastes [30] [31]. The idea of involving the private sector in residential solid waste management started in 1985. According to [32], the collection service by licensed private contractors was initiated in 1985 when private franchise of residential waste collection in high income residential layout areas was implemented.

## **VI. Solid waste management and gender involvement**

### **6.1 Gender**

The term gender was first used about 30 years ago to describe the characteristics of men and women which are socially decided in contrast to those characteristics which are biologically defined. Gender refers to women and men socially defined roles and characteristics, which are shaped by historical, economical, religious, cultural and ethnic factors. What is women work in one society might be men in another society. People are born female or male, but learn to be girls and boys who grow into women and men. They are taught what the appropriate behavior and feelings, roles and activities are for them and how they should relate to other people. This learned behavior is what makes up the gender identity and decides the gender roles [33]. Gender roles for women and men differ a lot from one culture to another and from one social group to another within the same culture. Race, class, economic circumstances, age all of this influence what is considered appropriate for women and men. Culture changes over time and so does gender patterns. Sudden crisis, like war or famine, can totally and quickly change what men and women do. Some times for a short period, but also some times forever. Also, in relation to human rights, culture and religion we find different roles for men and women determined by the society. Once we realize the difference between biological roles (which cannot be changed) and the gender roles (which can be changed), we are able to look in a new way at our own life and our role in society. Becoming aware of gender roles and understanding its reasons and roots give us a better possibility and choice for changing some gender roles and accepting others [33].

### **6.2 The Role of Women in Waste Management**

Women are involved in various aspects of waste management, including waste collection, recycling, and disposal. They often work in informal settings, such as markets and dumpsites, where they face numerous challenges, including lack of infrastructure, limited access to resources, and gender-based discrimination. Despite these challenges, women continue to play a crucial role in waste management, ensuring the cleanliness of public spaces and reducing the volume of waste in the public system. Women face numerous challenges in their roles in waste management, including limited access to resources, lack of infrastructure, and gender-based discrimination. They often work in informal settings with limited support and recognition, making it difficult for them to sustain their efforts.

### **6.3 Examples of women leading waste management innovations**

#### **1. Safi Organics**

Safi Organics, co-founded by Joyce Kamande, collaborates with over 3,500 woman-owned smallholder farms to produce organic fertilizer from agricultural waste. The main product, biochar, sequesters carbon and enriches soil, resulting in a 30% increase in yields and a 50% increase in income for over 12,000 farmers while recycling 60,000 tons of waste and rejuvenating 7,000 acres of farmland [34].

#### **2. Surakarta City**

A case study in Surakarta City, Indonesia, highlights the significant role women play in waste management. Women are involved in informal waste picking and recycling, contributing to the initial stages of waste management. The study emphasizes the importance of gender inclusion in waste management policymaking for more comprehensive and inclusive solutions [35].

#### **3. Women of Waste (WOW)**

WOW, an initiative led by women in the waste sector, conducted a global online survey in 2018 to map the status of women in the global waste management sector. The survey revealed that women contribute significantly to the sector in various roles, including local government, private waste management companies,

and consulting/engineering companies. Women are also actively involved in promoting waste prevention, reuse, recycling, and recovery of materials [36].

#### **4. Women Environmental Preservation Committee (WEPCO)**

WEPCO, a non-governmental organization in Nepal, was formed by 16 women to address waste management issues in Kathmandu. They created a new system to dispose of and manage solid waste, which has been successful and replicable in other districts [37].

#### **5. Reel Gardening**

Reel Gardening, a start-up in South Africa, uses a hybrid model to maintain commercial vegetable production. The organization focuses on skills transfer, sustainable development, and community gardens, providing women access to secure land and training [37].

#### **6. Informal Waste Management**

Women play a significant role in informal waste management, particularly in developing economies. They are often responsible for household waste segregation and collection, contributing to the initial stages of waste management [34].

#### **7. Community-Based Approaches**

Community-based approaches to waste management, such as the project in India, empower women through innovative waste management and sustainable development. The project aimed to achieve scientific disposal of solid waste, introduce community-based approaches, create livelihood opportunities for women, and promote sustainable development [34].

These innovations demonstrate the crucial role women play in waste management in emerging economies, from informal waste collection to formal recycling and sustainable development initiatives.

### **6.4 Role of women in sustainable waste management**

The role of women in sustainable waste management in Africa is crucial for the continent's environmental and economic development. Women play a significant part in waste management, particularly in informal settings where they are often the primary waste collectors and recyclers. Here are some key points:

**1. Informal Waste Management:** Women are involved in informal waste management, particularly in developing economies. They are often responsible for household waste segregation and collection, contributing to the initial stages of waste management [35] [38].

**2. Empowerment and Recognition:** Recognizing the significant contributions women make to waste management, both formally and informally, can lead to increased participation and empowerment. This includes providing economic incentives, such as financial support, microloans, or grants, to women involved in waste management [37] [38].

**3. Community Engagement:** Engaging women in community waste management initiatives, encouraging their participation in decision-making processes and waste management activities, can foster a sense of ownership and responsibility [38].

**4. Policy and Legal Framework:** Developing and implementing policies that promote gender equality and women's participation in waste management can lead to more comprehensive and inclusive solutions. This includes providing resources and support to women-led waste management initiatives and addressing the challenges they face [38] [38].

**5. Infrastructure Development:** Developing infrastructure that supports women's waste management activities, such as waste collection facilities and recycling centers can increase their involvement and effectiveness [37].

**6. Education and Awareness:** Conducting public awareness campaigns to educate women about the importance of waste management and their roles in it can increase their participation and empowerment [38].

**7. Economic Incentives:** Offering economic incentives such as financial support, microloans, or grants to women involved in waste management can enable them to expand their businesses and create more jobs [37].

**8. Partnerships and Collaborations:** Fostering partnerships between government agencies, NGOs, and private organizations to support women's involvement in waste management can lead to more effective and sustainable waste management practices [38].

**9. Capacity Building and Training:** Providing training and capacity-building programs for women in waste management, focusing on skills such as waste collection, segregation, and recycling, can enhance their involvement and empowerment [37] [38].

**10. Monitoring and Implementation:** Monitoring and implementing gender-inclusive waste management policies can ensure that they are effective and sustainable. This includes providing resources and support to women-led waste management initiatives and addressing the challenges they face [37] [38].

These points highlight the crucial role women play in sustainable waste management in Africa, from informal waste collection to formal recycling and sustainable development initiatives.

Impact of gender roles on waste management in Ibadan

### **6.5 Impact of gender roles on waste management**

The impact of gender roles on waste management is significant. Traditionally, women are responsible for household waste management, which includes tasks such as waste disposal and sanitation. This gendered division of labor is deeply ingrained in Nigerian society, with women often being relegated to the background in community and national-level decision-making processes related to solid waste management [35] [37]. The study by [39] found that women's active involvement in solid waste management in urban Nigeria is limited to household levels due to gender bias. Women are often excluded from managerial levels in solid waste organizations or governmental levels where decisions are made, leading to the abortion of expected results in terms of long-term sustainability and dependability of solid waste management schemes [1]. Furthermore, the study by [40] highlighted that women's roles in waste management are often limited by their cultural and societal expectations. For instance, in Ibadan, women are culturally predisposed to living through waste sorting practices that are primarily focused on making extra income rather than environmental sustainability [34].

To address these issues, it is essential to incorporate gender considerations into municipal solid waste management policies and practices. This can be achieved by empowering women through education and training programs that focus on waste management and recycling. Additionally, involving women in decision-making processes and providing them with the necessary resources and support can help to increase their participation and influence in waste management activities [35] [37].

## **VII. Conclusion**

The very definitions of waste and discarded materials may be influenced by the gender of the person making the judgment. Knowledge of waste issues is different across gender and age. As the case may be one expect that men and women re-value waste materials differently and see their usefulness for different purposes, such as domestic utility, saving on household expenditures, earning money, or other purposes. Therefore, the involvement of women in municipal solid waste management in Nigeria is crucial for the success of waste management schemes. However, their involvement is often overlooked and undervalued, leading to a lack of recognition and support for their efforts.

## **VIII. Recommendation**

To address this gender gap, policies must be implemented that promote the involvement and empowerment of women. This includes providing training and resources to women involved in waste management, increasing their representation in decision-making processes, and recognizing their contributions to the sector. To increase women's participation in municipal solid waste management in Nigeria, several strategies can be employed:

**1. Capacity Building and Training:** Provide training and capacity-building programs for women in waste management, focusing on skills such as waste collection, segregation, and recycling. Offer workshops and seminars to enhance their knowledge and understanding of waste management practices and policies [37] [38].

**2. Empowerment and Recognition:** Recognize the significant contributions women make to waste management, both formally and informally. Empower women by providing them with leadership roles and decision-making positions in waste management organizations and government agencies [37] [38].

3. **Economic Incentives:** Offer economic incentives such as financial support, microloans, or grants to women involved in waste management, enabling them to expand their businesses and create more jobs [37].

4. **Community Engagement:** Engage women in community waste management initiatives, encouraging their participation in decision-making processes and waste management activities. Organize community events and awareness campaigns to promote women's involvement in waste management [38].

5. **Policy and Legal Framework:** Develop and implement policies that promote gender equality and women's participation in waste management. Enact laws that protect women's rights and interests in waste management, ensuring their safety and well-being [37] [38].

6. **Partnerships and Collaborations:** Foster partnerships between government agencies, NGOs, and private organizations to support women's involvement in waste management. Collaborate with international organizations to access funding and expertise for women-led waste management initiatives [38].

7. **Education and Awareness:** Conduct public awareness campaigns to educate women about the importance of waste management and their roles in it. Integrate waste management education into school curricula, focusing on the involvement of women in waste management [38].

8. **Infrastructure Development:** Develop infrastructure that supports women's waste management activities, such as waste collection facilities and recycling centers. Ensure that these facilities are accessible and safe for women [37].

By implementing these strategies, women's participation in municipal solid waste management in Nigeria can be significantly increased, leading to more effective and sustainable waste management practices.



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