

## Gender contrast in household solid waste management in Bamako District

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**ABSTRACT:** Waste production is an integral part of life, and its management is essential for our well-being and development. Unfortunately, we observe that its poor management in Bamako is detrimental to our health and environment. This is due to the inconsistency of the management chain, with efficient basic management supported by women and continuity lacking clear practical guidance because of the absence of women. In other words, women are excluded from the part of the chain where there are greater economic benefits. Worse still, even at lower levels where they fully perform their roles, they do not benefit from social security and protection. This jeopardizes the achievement of SDG1 (Sustainable Development Goal), SDG5, and SDG8 in the circular economy sector. After this study, we recommend to the Malian Government to creating a national waste agency for an efficient analysis of gender considerations in the household solid waste management system and chain in Bamako.

The objective of our work is to highlight the harm to women and children, the role of women and consequently their level of responsibility in waste management in Bamako district.

**KEYWORDS:** household solid waste management, gender, Bamako District.

### 1 INTRODUCTION

Waste generation is inherent from human life (activities). Unfortunately, waste management is more critical in developing countries, which do not always have the necessary resources to manage it properly. Consequently, waste production continues to increase in both quantity and quality, thus generating enormous risks for the environment and public health (Ould Aloueimine S, 2006). The management of household solid waste is a particularly acute issue in Bamako District. Currently, the sector is characterized by weak organization among stakeholders, insufficient resources, and a lack of sustainable strategies. Poor management of household solid waste is the root cause of several diseases, the primary victims of which are women and children involved in sorting and recycling waste. Do these women and children have a role to play in the management of the household solid waste that affects them?

The goal of our studies is to assess the integration of gender considerations into the household solid waste management mechanism in Bamako.

### 2 LITERATURE REVIEW

#### 2.1 WOMEN AND GIRLS: KEY PLAYERS IN WASTE MANAGEMENT

The presence of women and girls in sorting waste for recycling is a logical consequence of their crucial role in waste management. They are in the first line in the supply chain and, therefore, in the circular economy, which, currently, is primarily based on waste recycling in developing countries. This presence of women and girls in waste management can be both a commitment and a form of resilience. *"African women, as a social symbol of cleanliness, are particularly motivated and play a leading role in innovating sanitation practices."* stated Keita M (2001). In this logic, it is easy to understand why household waste management concerns women and girls more, since they are responsible for domestic tasks including the collection of household waste and/or the maintenance of cleanliness in public spaces, which are perceived in the majority of our societies as an extension of the domestic tasks assigned to them (Azaiez S and Poupeney V, 2020; Ouédraogo C R, 2024).

2.2 CHILDREN’S PRESENCE IN LANDFILLS

Like adults, children are exposed to toxic gases and sharp objects such as rusty nails or shards of glass, but the under-five age group has the highest rates of illness compared to other age groups (Possilettya J K-B et al., 2019). Because of hunger, these children may be tempted by spoiled food that is attractively packaged. How do children end up in landfills? The stories vary depending on their age. Many women sort out through waste at the Mbeubeuss landfill in Senegal with their children because they have no one else to look after them (Ndiaye I., 2024). Some children join the sorters for economic reasons because they live in families supported by widowed or abandoned mothers, while others are drawn by the earnings of their peers.

2.3 DISADVANTAGES OF WOMEN IN WASTE MANAGEMENT

Women are more involved in environmental management because they are the first to suffer from the consequences of climate change (UN Women, 2020). While many studies support women’s active participation in waste management, it is often overlooked (Margot J and Chloé M, 2025). This is a true example of gender disparity in waste management. In this informal sector, UN Women (2020) found that women are primarily relegated to lower-level positions, working in waste collection and sorting at landfills with fewer economic benefits and very limited access to decision-making and strategic guidance.

3 MATERIALS AND METHODS

3.1 STUDY SITE

Capital of Mali, Bamako, is located between 12°29’57” and 12°42’17” north latitude and 7°54’22” and 8°04’06” west longitude. The city has been developed in the Niger River valley, which divides it into two parts (Diallo B. A. & al., 2022): the left bank and the right bank. The population growth rate, averaging 4.5% between 1976 and 2009, was almost equal to its rate of spatial expansion (Diarra B., 2015). The city of Bamako plays a significant economic role in Mali. The populations of Bamako and its surrounding areas are dependent on a single economic center, dominated by commercial activities and characterized by informal employment (Bertrand M., 2021). The main economic activities are trade, crafts, construction-related trades (electricity, masonry, welding, carpentry, painting, sand extraction from the river, brickmaking), industry, public and private sector jobs, fishing on the Niger River, transport, sanitation, catering, market gardening, etc. Bamako has expanded from six municipalities covering 267 km<sup>2</sup> to ten by absorbing surrounding villages through Law N° 2023-06/CNT, covering an area of 729 km<sup>2</sup> representing an additional surface area of 462 km<sup>2</sup>.

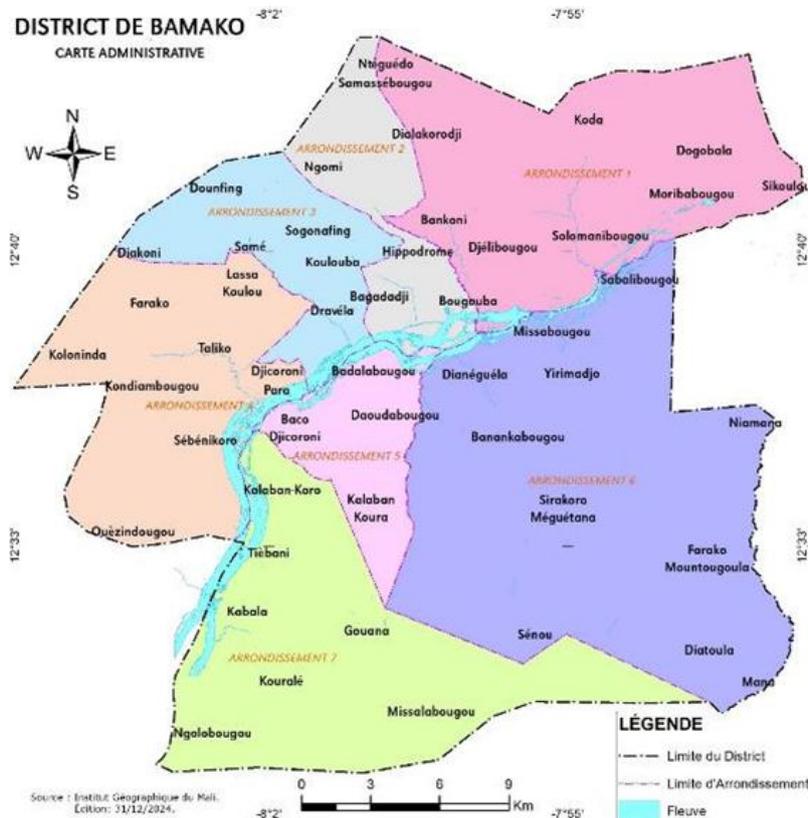


Fig. 1. New administrative map of Bamako (IGM, 2024)

### 3.2 METHODOLOGY

The quantitative and qualitative surveys are based on:

- Interviews with organizations involved in waste management in Bamako.
- Interviews with waste sorters and recycling companies.
- Field visits on waste dumping sites for field observations and to notice the working conditions of the waste sorters.

## 4 RESULTS AND DISCUSSION

### 4.1 HEALTH RISKS FOR WASTE SORTERS

The first observation is that waste sorters operate in landfills without personal protective equipment (masks, gloves, sturdy shoes, etc.). This is the same for most collectors/transporters. They are therefore exposed to several health risks, starting with injuries from sharp objects such as shards of glass or pieces of metal. Across ten landfills (eight illegal and two authorized), we counted 225 waste pickers (men, women, and children), of whom only 21% wore partially some PPE such as dust masks and gloves, and 79% wore neither masks nor goggles, nor gloves (Fig 2). This roughly replicates the results of Coulibaly S (2022). Tini A (2003) in his work in Niger, and Adamou M (2021) in Mali, obtained results along the same lines, namely that more than 70% of waste pickers operate in the landfills without any health and safety protection.

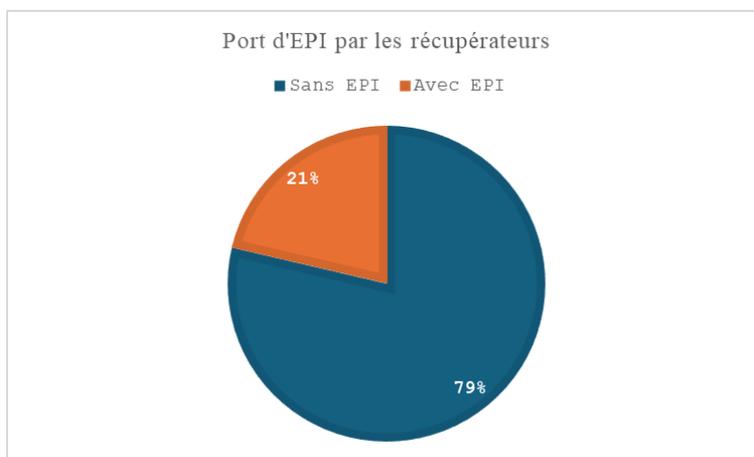


Fig. 2. Wearing of PPE by sorters

Unfortunately, lacking first aid treatment on site, waste sorters suffer wounds that eventually become infected and/or even gangrenous. These include diseases transmitted by microbiological vectors, bites from animals such as stray dogs and cats that roam around garbage dumps, illnesses due to poor hygiene, and respiratory problems caused by inhaling toxic fumes. De Lavergne C and Gabert J (2005) also drew attention to dermatological problems caused by direct contact with irritants, not to mention diseases transmitted through the presence of animals and human excrement due to the lack of toilets, especially at illegal dumps. Miquel G and Poignant S (1999) concur, mentioning muscle injuries and contamination resulting from manual sorting. It is therefore necessary, if not essential, to organize awareness sessions (Fig 3) on hygiene, safety, and health for waste sorters, especially those working at illegal dumpsites without administrative oversight. Furthermore, measures must be implemented to prohibit access to formal sites without personal protective equipment (PPE).



*Fig. 3. Awareness session during our field visit*

#### 4.2 CHILDREN IN DUMPS: LACK OF SCHOOLING/DROPOUT AND ILLNESS RISK

It is regrettable to note the constant presence of children (of school age) in dumps (Fig 4) at all times of the year. Furthermore, De Lavergne C and Gabert J (2005) clearly stated that in families of waste pickers, children do not attend school and only learn this trade, which they will reproduce in adulthood like their parents or guardians. This is the vicious and hereditary cycle of waste collection. Doumbia B et al. (2022) go further, noting a gender effect: these children follow their grandmothers and mothers to earn their daily living in the dumps in Bamako. Durand M (2012) stated that the presence of children in informal waste collection can also be explained by family poverty. In these cases, entire families end up at the dump. One child even confided in us that he arrived at this activity during the holidays to prepare for the start of the next school year, but he couldn't save any money because he gave it to his parents. He eventually dropped out of school permanently, a decision that he deeply regrets, as he can't even afford medical care if he gets sick.

De Lavergne C and Gabert J (2005) add that other dangers are less visible but more insidious, causing long-term damage. These children carry loads that are disproportionately heavy for their age and weight.

According to our interview with civil protection agents, the worst part is that in this environment, many children end up falling into drug and alcohol abuse. As for the girls, they are victims of early sexual activities, sometimes subjected to violence and rape by the boys.

We observed the presence of children on all types of transit dumping sites (authorized and unauthorized), unlike in Mbuji-Mayi where Kangoy K et al. (2016) concluded that uncontrolled dumping sites are the more source of accidents for children. The situation of these children should attract the attention of education stakeholders. As in Phnom Penh and Antananarivo, Father Pedro's "For a Child's Smile" initiatives can help these children escape the vicious cycle of scavenging at dumps by enrolling them in school or facilitating vocational training, as in Kenya (Bélanger JF, 2022; De Lavergne C and Gabert J, 2005). Approaches may differ, but the ultimate goal is to remove school-aged children from this environment and create conditions that prevent their return.



*Fig. 4. Children in an illegal dump in Sotuba*

4.3 GENDER NEGLECTED IN WASTE MANAGEMENT AND THE CIRCULAR ECONOMY

Moreover, as Doumbia B et al. (2022) observed, sorting at landfills in Bamako is predominantly carried out by women (90.5%). Given their domestic workload in general, and their particular difficulties in socio-professional integration, waste recycling represents a promising sector for them, offering opportunities for integration and the creation of local jobs (Boudra L, 2020).

From the analysis of the household solid waste management system and supply chains in Mali, as in other developing countries, waste collection and treatment are primarily handled by the informal sector, which is heavily reliant on women who earn more from collecting and selling recyclable materials to intermediaries.

In Pune, India, 90% of waste collectors in the informal sector are women (Boudra L, 2020). We also observed that all the principles are also present in the cleaning and waste management sector in Bamako district, based on figures from COGIAM (Collective of Economic Interest Groups Working in Sanitation in Mali) and CDIS SARL, the company responsible for street cleaning in neighborhoods on the right bank of the Niger River in Bamako. The waste management sector is a significant economic sector, generating employment and offering opportunities for women and girls to access income. Although few in number, some women manage to create Economic Interest Groups (EIGs) (as noted in the COGIAM directory).

As observed, women are more numerous at the bottom of the hierarchy, occupying lower-paying positions. Analysis of COGIAM-affiliated EIGs reveals that 91.67% of the 180 EIGs are created by men, while women represent only 8.33% of the 180 EIG promoters (Fig 5). Currently, the streets are cleaned by DSUVA (Direction of Urban Services for Roads and Sanitation) through local contractors. At the service provider CDIS as well, we have observed that the female team is more used in sweeping work than in supervision.



Fig. 5. Distribution of EIG promoters by gender

The 160 sanitation workers are comprised of 70% women and 30% men (Fig 7). This trend is even more pronounced in other African cities, such as Mbuji-Mayi/DRC, where Kangoy K et al. (2016) found that waste management was handled more by women (94.7%) than by men. However, supervision is exclusively carried out by men at CDIS. Our figures far exceed those reported by Margot J and Chloé M (2025), which range from 24% to 42% depending on the region, but these authors acknowledge that their figures do not include independent women or those working with their husbands.

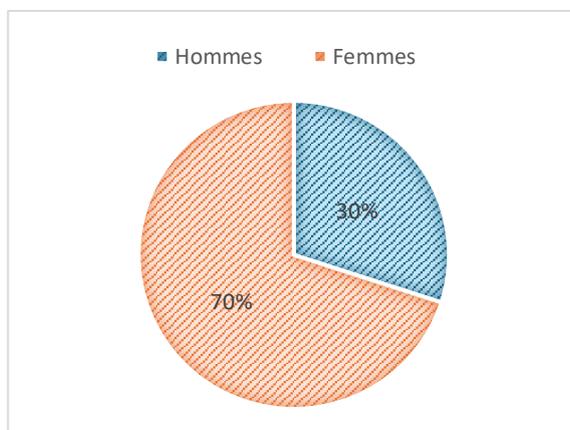


Fig. 6. Distribution of CDIS sweepers by gender

Although it fails to consider gender and keeps women and girls, who are paid less, on the front lines, waste collection and treatment allows them to have work that is compatible with family obligations (Margot J and Chloé M, 2025). As this work reveals, we also conclude from a review of all the studies examined that very few women are involved in decision-making regarding waste management strategies, orientations, and plans. This is a recurring issue, having been observed for over thirty years, as evidenced by Seck M's doctoral thesis (1997) on waste management in Dakar. However, all studies have shown that sustainable human development is not possible without the full participation of women, who, moreover, are both most actors in the waste sector and most victims of the environmental consequences of waste. Therefore, their full participation in the development of waste management strategies and policies is necessary, although most of these women are handicapped by their level of education, as shown in the studies by Akely R M J & al (2024) on the socio-cultural characteristics of the actors in the informal recovery of plastic waste in Abidjan.

#### 4.4 THE NEED TO ORGANIZE INFORMAL WASTE RECYCLING ACTORS

Based on the analysis of information gathered from actors involved in the recovery and recycling chain, this recovery process is fragmented. In this respect, our studies align with those of Ouattara I and Kiré M (2018), who also observed that waste pickers most often operate individually without a formally structured organization. Furthermore, it has been noted that in most developing countries, only recycling plants are part of the formal sector; waste pickers and intermediary buyers belong to the informal sector without legal status (De Lavergne C and Gabert J, 2005). Without structure, the length of the sales chain is detrimental to waste pickers because the recovered waste is sold to intermediaries who, in turn, resell to wholesalers, who then sell the recyclable raw materials (RRM) to local industries or artisans.

This necessary structuring already has a foundation, as we observed that the women we met at the garbage dumps always designated the oldest woman as the site president and the most educated woman as the one in charge of collecting dues. Therefore, it is necessary to organize them into formal associations or cooperatives to promote their training and better capitalize on their work. The municipality of Bamako could then draw inspiration from the city of Buenos Aires, where waste pickers are legally recognized and, consequently, are supported and trained (De Lavergne C and Gabert J, 2005). Another example of inspiration could be the project to formalize waste picker associations in the city of Bogotá, where recyclable waste is collected and sorted primarily by women who are organized into associations so that they can gain recognition for their work and be able to negotiate better working conditions, since they lack access to social rights (WECF, 2023).

A better structural organization of waste pickers would also benefit recyclers who suffer from a lack of raw materials, mainly due to informal sales outside the country. It is therefore necessary to create formal structures, as in Kinshasa or Ouagadougou, to establish controllable sales networks, not only for better economic profitability for the pickers but also for an efficient supply for recyclers. Furthermore, this formal structure will allow public economic services to better control the fraudulent export of recyclable waste. Let's follow Margot J and Chloé M (2025) on their journey, with some examples of structural support for women involved in sorting and recycling household solid waste in Vietnam.

- The women's municipal union in Da Nang city (central Vietnam) has established groups to provide training on waste and plastics, particularly source separation. The results are tangible: 80% of households participate in source separation.
- Nguyen Thi Nhat Hoai (gender expert with the Vietnam National Plastic Action Partnership - NPAP) stated that since women are primarily responsible for managing daily household chores, they should benefit from a program similar to the one in Binh Duong province (southern Vietnam), where women waste collectors received 0% interest loans. Patrick Haverman (Deputy Resident Representative of the United Nations Development Program in Vietnam) emphasized that women, who play a key role in the collection, sorting, and recycling of plastic waste, must be considered by authorities in the policy-making process.
- We will conclude this literature on the need to support women with statements from Shawn Steil (Canadian Ambassador to Vietnam), who announced that Canadian funding programs and projects aim to support women's rights and livelihoods in order to contribute to the transition to a more sustainable and circular economy.
- These are just a few examples that should inspire the authorities of the Bamako district to better involve women in the context of the circular economy.

## 5 CONCLUSION

This inefficient management can be partly attributed to the lack of formal involvement of women in decision-making and in the development of policies and strategies, even though they are the key players in waste management. They are limited to fully assuming their core function of cleaning households and streets and sorting recyclable waste, which is more economically beneficial to intermediary operators who then transport it to recycling companies.

In Bamako, the circular economy does not appear to be formalized, even though a rational circular economy represents an economic advantage for the State (through control of the flow of recycled raw materials) and for the stakeholders, who are predominantly women (through the creation of businesses and jobs). Formalizing the circular economy to promote the implementation of SDG 8 (Decent Work and Economic Growth / Target 8.3: Promote pro-job creation and pro-entrepreneurship policies and Target 8.5: Achieve full and productive employment and decent work for all, including women and youth). This implementation of SDG 8 is primarily based on Principle 20 of the Rio de Janeiro Earth Summit ("*Women have a vital role in environmental management and development. Their full participation is therefore essential*

for achieving sustainable development." ). Women's involvement would also be an important lever for achieving SDG 5 (Gender Equality / Target 5.5: Ensure the full participation of women in leadership and decision-making positions). This is also an opportunity to remind the failure to take into account this segment of the active workforce in the National Gender Policy and in the labor code, which nevertheless consider other women working in the informal sector. The framework and formalization of the circular economy would promote the achievement of SDG 1 (No Poverty / Target 1.3: Implement systems and Appropriate national social protection measures for all, including basic necessities, and by 2030 achieving substantial coverage for the poor and vulnerable, are essential, given that key players in recycling and the circular economy (particularly women) come from disadvantaged social backgrounds. Furthermore, most of these women are mothers of several children whom they struggle to provide adequate healthcare without a formal social protection system.

As recommendation, the Malian State must create a national waste agency responsible for:

- Organizing waste collectors and sorters into cooperatives.
- Strengthening the capacity of sorters through technical training.
- Supporting sorters' cooperatives in their search for financing or creating a special fund for this sector.
- Structuring the circular economy and recycling effectively.
- Facilitating sorters' enrollment in insurance and pension schemes or facilitating the creation of a mutual aid society.

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