World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Comparative analysis of organic waste management practices according to the level of urbanization in Burkina Faso

Hamza OUÉDRAOGO [1, 3], Issaka SENOU [1, 2, 3, *] and Hassan Bismarck NACRO [3]

[1] *Laboratory Bioresources, Agrosystems and Environmental Health (LaBASE), Institute of Rural Development (IDR), Nazi Boni University of Bobo-Dioulasso. BP 1091 Bobo-Dioulasso (Burkina Faso).*
[2] *Institute of Environmental Sciences and Rural Development, Daniel Ouezzin COULIBALY University(UDOC), BP: 176, Dédougou (Burkina Faso).*
[3] *Soil Fertility Study and Research Laboratory (LERF), Institute of Rural Development (IDR), Nazi Boni University of Bobo-Dioulasso. BP 1091 Bobo-Dioulasso (Burkina Faso).*

World Journal of Advanced Research and Reviews, 2026, 29(03), 1697-1709

Publication history: Received on 10 December 2025; revised on 13 March 2026; accepted on 16 March 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.29.3.0142

Abstract

This study analyses organic waste management practices and households' willingness to adopt sustainable recovery methods in three localities in the Guiriko region of Burkina Faso. The survey of 278 households in Bobo-Dioulasso, Bama and Kotedougou shows that the locality is the main determinant of management methods with a highly significant association, contrary to individual sociodemographic characteristics. Subscription to a formal service is exclusively observed in Bobo-Dioulasso, without being generalized, while non-subscriber households mainly use 50% wild deposit and 46.7% incineration. Valuation preferences vary greatly depending on the urbanization gradient, with Kotedougou and Bama favoring composting with free removal and remuneration at 94.2% and 86.5%, while Bobo-Dioulasso divides between free sorting at 52.2% and composting at 37.5%. The use of raw waste as an amendment follows a rural-urban gradient with 73.1% in Kotedougou, 62.9% in Bama and 35.3% in Bobo, and is influenced by gender with an odds ratio of 2.35, education level and occupation. These results call for a territorialization of intervention strategies in waste management.

Keywords: Organic waste; Territorial management; Composting; Burkina Faso

1. Introduction

Waste generation is now one of the main challenges of environmental management (Kumari & Raghubanshi, 2023). Population growth, urbanization, industry, modernization and digitization are driving the increase in waste (Pandey *et al.*, 2023). In addition, consumer behavior has shifted from utilitarian to hedonic consumption (Kar, 2022). This change has led to an increase in the variety and volume of waste generated, driven by technical progress and changing social values (Makan *et al.*, 2020; Malter *et al.*, 2020). According to Maalouf & Mavropoulos (2023), global waste production in 2017 was around 20 billion tons, or 2.63 tons of waste per capita per year. The authors go on to say that global production is expected to reach 46 billion tons in 2050. Burkina Faso is not on the margins of this situation. Over the past three decades, with the expansion of urban centers such as Ouagadougou, Bobo-Dioulasso and other secondary cities, waste generation has become localized and varied (National Census Committee, 2022). Improving living standards and increasing accessibility to modern technologies, including household appliances, electronic equipment and pharmaceuticals, have led to a diversification and increase in the types of solid waste. According to Kumari & Raghubanshi (2023), this development poses major challenges for local authorities, as the infrastructure, staff and equipment needed for waste management are often not foreseen to support such rapid growth.

* Corresponding author: Issaka SENOU

In Bobo-Dioulasso, for example, the amount of waste produced increased sharply, from about 66,654 tons per year in 1985 to 287,504 tons in 2019 (National Institute of Statistics and Demography, 2019). This trend is correlated with urbanization. Despite the growing number of collecting associations and companies, the situation is not really improving as the waste collected is often deposited in empty land that gradually becomes uncontrolled landfills (Senou *et al.*, 2023).

In peri-urban areas, the situation is even more critical. Located at the transition between cities and the countryside, these areas are the most privileged for waste landfill facilities in cities (Amenta *et al.*, 2019). In addition, with their large spaces they attract industrial developers for the establishment of factories, sometimes too polluting to stay in the city center (Dolui & Sarkar, 2023). They thus become spaces crossed by various streams of household and industrial waste (Amenta *et al.*, 2019).

Waste generation in rural areas is generally lower, mainly composed of biodegradable materials such as agricultural residues and food waste (Taghipour *et al.*, 2016). However, the gradual introduction of manufactured products changes the nature of waste and makes it more difficult to manage in the traditional way. Without technical means and awareness, waste is often abandoned in the wild or burned in the open or thrown into waterways (Ferronato & Torretta, 2019). These practices have serious repercussions, both on the environment and on the health of populations.

This study aims to analyze current waste management practices in the different environments: urban, peri-urban and rural. What are the characteristics of the populations of these different localities? This question helps to situate the human and social framework of the study. Sociodemographic characteristics often influence attitudes, practices and perceptions towards waste management and the adoption of innovations. The type of waste varies according to urban, peri-urban and rural environments, what about their management? The answer to this question makes it possible to identify the limits and therefore the actions to be taken to encourage the adoption of more sustainable waste management practices.

2. Equipment and methodology

2.1. Presentation of the study area

The study was conducted in three localities in the Guiriko region of Burkina Faso: Bobo-Dioulasso in urban areas, Bama in peri-urban areas and Kotédougou in rural areas. They were selected to represent the different levels of urbanization in the country. This helps to understand the diversity of waste management practices and perceptions.

Located 365 km southwest of the capital Ouagadougou, Bobo-Dioulasso is the country's second largest city. It is located at coordinates 11° 10′ 59″ North, 4° 16′ 59″ West. Due to its geographical position, the municipality of Bobo-Dioulasso is an important crossroads for trade, transport and industry: it is the economic capital of Burkina Faso. Due to the diversity of economic activities and its strong population growth, the city is the second largest producer of waste in the country after Ouagadougou (National Institute of Statistics and Demography, 2019). According to Yazid *et al.* (2017), organic waste is rarely recovered on a large scale.

The town of Bama is 30 km from Bobo-Dioulasso. It is a peri-urban locality in the region of Guiriko. It is located at coordinates 11° 22′ 26″ North and 4° 24′ 48″ West. Thanks to the fertility of its land, Bama is a major agricultural hub, particularly for rice, maize and vegetables (MAAH, 2020). Like the other municipalities in the country, waste management remains poorly structured. As noted by Senou *et al.*, (2023), collection devices are virtually non-existent, leaving room for open-air deposition and burning practices. Although the area has a large amount of agricultural waste, its recovery into compost is still underdeveloped.

Kotédougou is a rural commune located about 22 km northwest of Bobo-Dioulasso in the Tuy province, Guiriko region. It is located at coordinates 11° 12′ 07″ North and 4° 08′ 03″ West. The economy of the municipality is mainly based on food farming, cotton cultivation and market gardening as well as traditional livestock farming (MAAH, 2020). Waste generation is lower in volume compared to urban and peri-urban areas. They consist mainly of organic waste from agricultural and domestic activities.

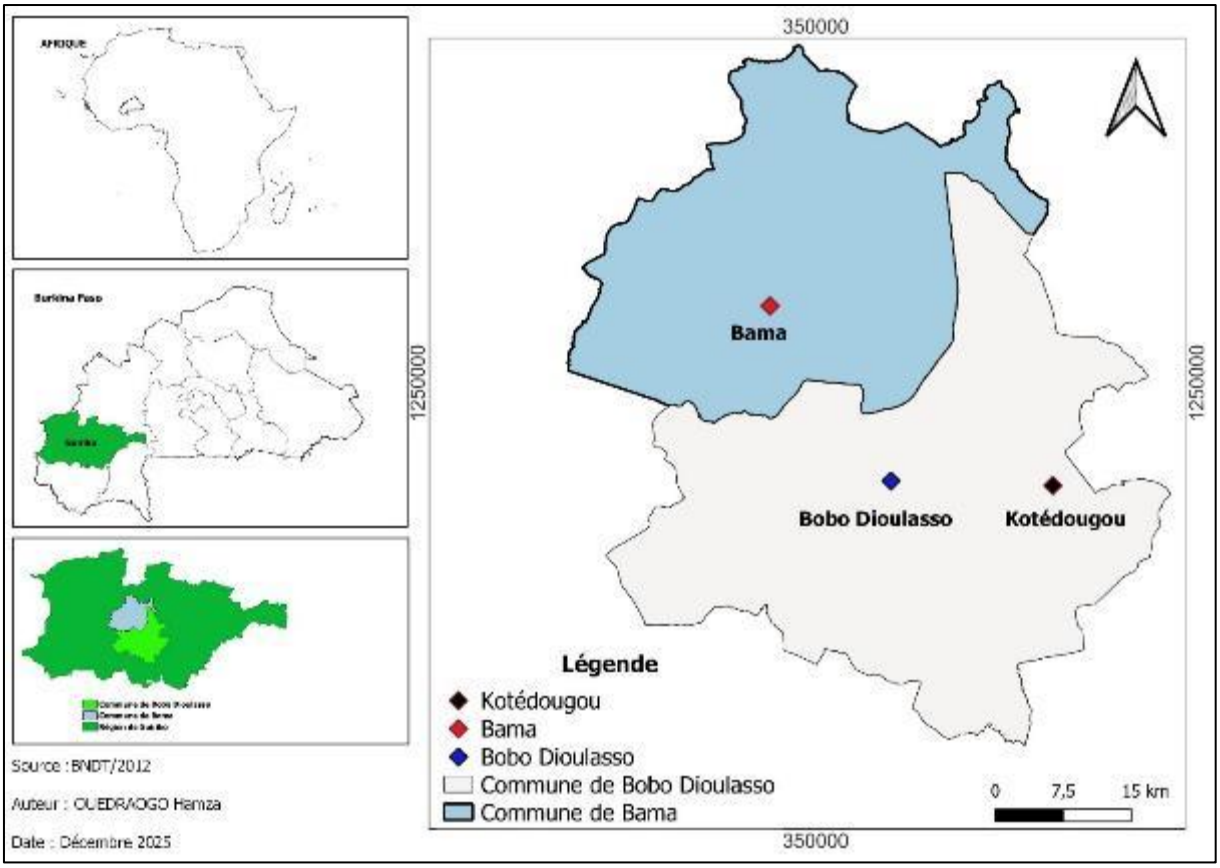


Figure 1 Location map of Bama, Bobo-Dioulasso and Kotédougou

2.2. Search method

2.2.1. Target population

The populations studied are households residing in the communes of Bobo-Dioulasso, Bama and Kotedougou. They were selected as analytical units because of their direct involvement in production and day-to-day management of waste. This distribution ensures a representativeness of the three levels of urbanization in Burkina. The gender balance is balanced, allowing for a diversity of experiences and perceptions to be considered in waste management practices. Regarding age, many respondents belong to the category of adults between 20 and 60 years. They are usually the ones who make the decisions related to waste management within the household.

2.2.2. Sampling method

The study adopted a stratified random sampling method. It consists of a geographical stratification of the survey areas. Three main strata were defined according to the types of environments: urban (Bobo-Dioulasso), peri-urban (Bama) and rural (Kotedougou). This distribution helps to understand how waste management varies according to the different environments. Within each stratum, the number of households was broken down by sector, i.e. 33 sectors in Bobo-Dioulasso and 05 in Bama. The village of Kotedougou was a sector because of its low population density.

2.2.3. Sample size

Sample size determination was guided by a reasoned approach. It considers the population size in each locality (Table 1). The total sample size was 278. It was distributed among the three localities surveyed: 136 in Bobo-Dioulasso, 89 in Bama and 53 in Kotedougou. This distribution is not strictly proportional to the size of the labor force. The aim of this is to guarantee representativeness of each territory to allow a reliable comparison. Thus, sampling rates are higher in less populated areas.

Table 1 Population and sample sizes

Locality	Total active population (46,2%)	Investigated workforce	Survey rate (%)
Bobo-Dioulasso	904 920	136	0,00015
Bama	85 834	89	0,0010
Kotédougou	6 568	53	0,008

2.2.4. Data collection tools and techniques

Description of the survey questionnaire

The questionnaire used contains 36 questions grouped under five headings. The first part deals with the socio-demographic characteristics of the respondents such as age, sex, marital status, educational level and occupation. The second part focuses on current waste management practices, including waste types, management methods and their use as fertilizers. The third part assesses the respondents' knowledge of waste recovery techniques. The fourth part measures households' commitment to sustainable waste management and identifies their preferences among several proposed management options. The last part explores attitudes and barriers related to waste management, including household perceptions and constraints. After the design of the questionnaire, a pre-survey was carried out among ten households when contacting neighborhood and community leaders. It aimed to test the clarity and relevance of the questions, to identify the difficulties of understanding. Feedback enabled the final version to be validated before its large-scale deployment.

Administration of the questionnaire to households

Interviews with respondents were conducted at their homes to ensure a better understanding of the issues, to reduce interpretation bias by explaining the issues as needed, and to translate into the local language. Before each interview, a brief presentation of the study was made. Respondents were interviewed in a quiet, closed-hearing environment to ensure a minimum of confidentiality and comfort to promote sincere responses.

2.2.5. Statistical analysis of data

Data from the surveys were entered into Excel and then cleaned and codified before statistical analysis with the R software. Several complementary methods were mobilized to meet the objectives of the study.

Initially, the independence Chi2 tests compared socio-economic and demographic characteristics, waste management practices and household perceptions by locality. Subsequently, binary logistic regressions measured the effect of respondents' characteristics on the adoption of waste management practices and their perceptions, depending on the type of locality. To deepen the analysis, multiple correspondence analyses identified household profiles according to their uses of organic waste for fertilization of their field.

3. Results

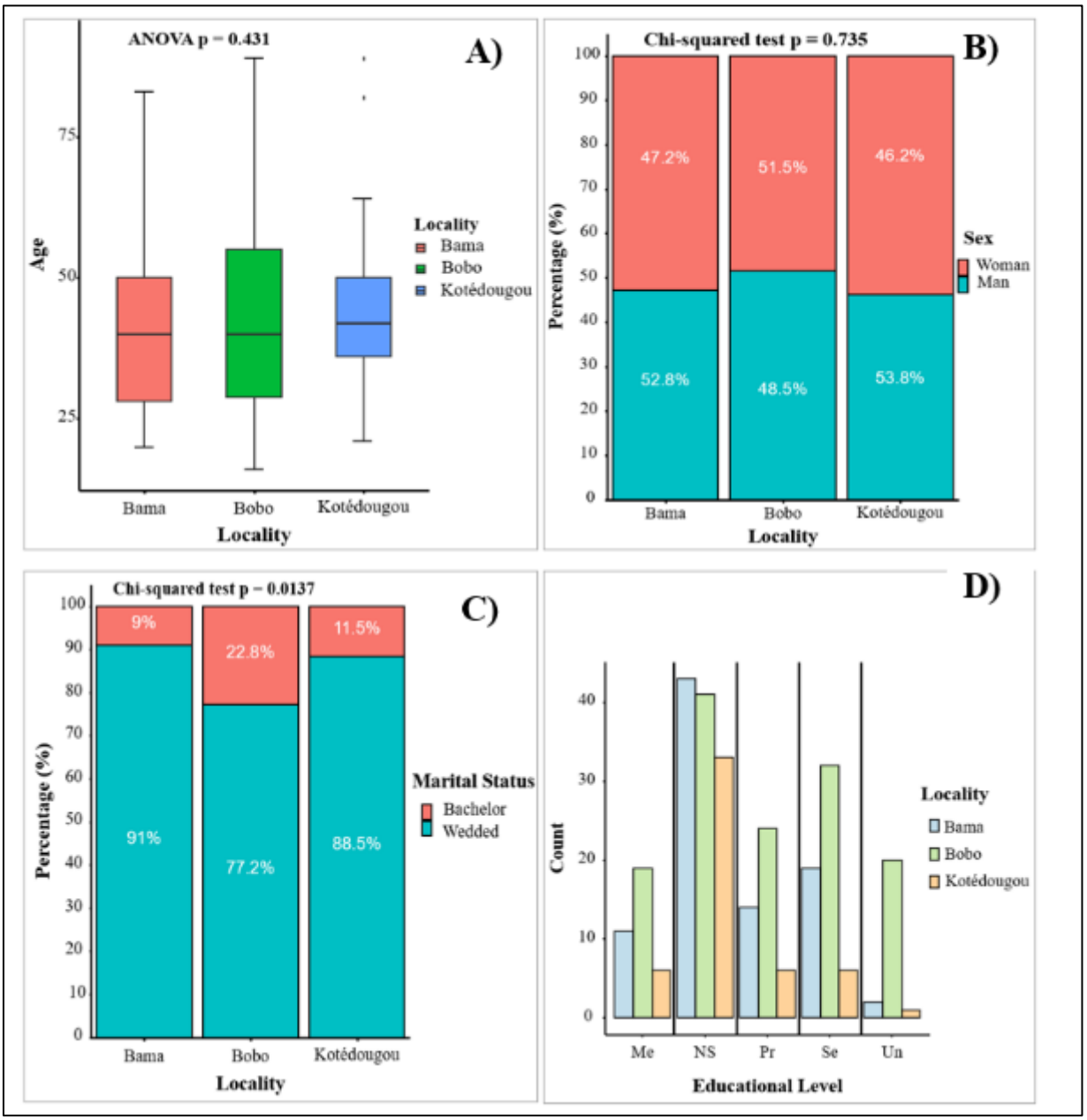
3.1. Characteristics of the interviewees between Bama, Bobo and Kotedougou

3.1.1. Socio-demographic characteristics of respondents by location

Socio-demographic characteristics included age, sex, marital status and educational attainment (Figure 1). The ANOVA analysis resulted in a p-value of 0.431, reflecting the absence of a statistically significant difference between the mean ages of the respondents (A). The average age is 40 years in Bama, 42 years in Bobo and 45 years in Kotedougou, with overall values between 20 and 75 years.

In terms of sex distribution, the Chi-square test gave a p-value of 0.735, indicating a homogeneous distribution between the three localities. In Bama, 52.8 per cent of respondents were men compared with 47.2 per cent women; in Bobo, 48.5 per cent were men compared with 51.5 per cent women; in Kotedougou, 53.8 per cent were men compared with 46.2 per cent women. The Chi-square test showed a significant difference between localities regarding marital status ($p = 0.0137$). Many respondents are married with 91% in Bama, 77.2% in Bobo and 88.5% in Kotedougou.

The distribution of the respondents according to level of education showed that out-of-school (Ns) predominate with 117 individuals, including 43 in Bama, 41 in Bobo and 33 in Kotedougou. The secondary level (Se) is the second dominant category with 32 people in Bobo, 19 in Bama and 6 in Kotedougou. The primary level (Pr) has 24, 14 and 6 persons respectively. The medersa level (Me) appears with 19, 11 and 6 people, while the university level (One) has the lowest enrollment with 20 people in Bobo, 2 in Bama and 1 in Kotedougou.



Non-formal level (Ns), primary level (Pr), secondary level (Se), medersa level (Me) and university level (Un); Distribution of ages (A), gender (B) marital status (C) and level of education (D) by locality

Figure 2 Socio-demographic characteristics of respondents

3.1.2. Distribution of professional activities in the three study localities

The distribution of professional activities in the three localities is divergent (Figure 3). In Bama, farmers/herders (AE) account for the largest share, followed by traders (Co). Craftsmen (Ar), civil servants (Fo) and unemployed persons (Ch) appear in smaller proportions, while the category of pensioners was zero.

In Bobo, the distribution is more diversified. Farmers/ranchers (AEs) remain dominant, but traders (Cos) occupy a larger share than in other localities. Artisans (Ar) and civil servants (Fo) are also more represented, as are the unemployed. The presence of pensioners is still the lowest.

In Kotedougou, farmers/herders (AEs) dominate the occupational structure, accounting for the vast majority of declared activities. Traders (Co) and craftsmen (Ar) appear in smaller proportions. The categories of civils servants and unemployed persons were zero.

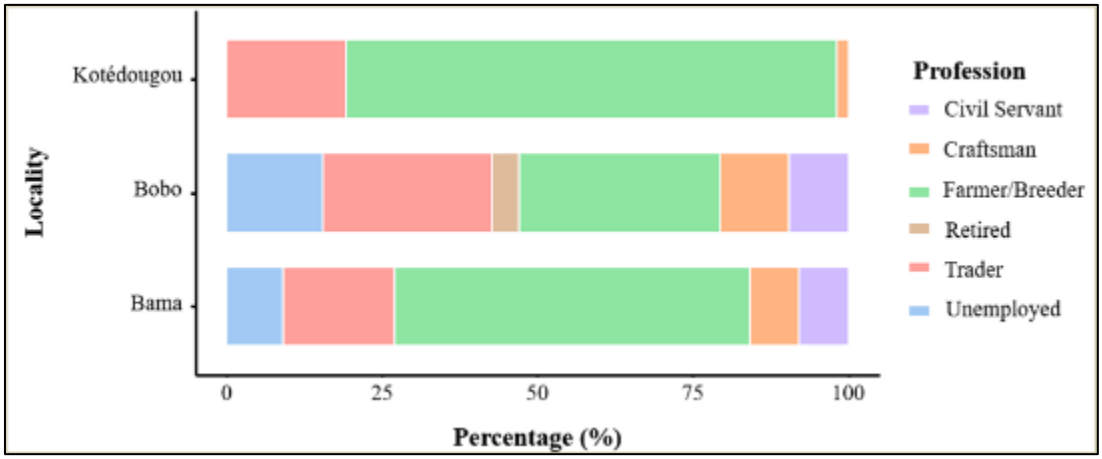
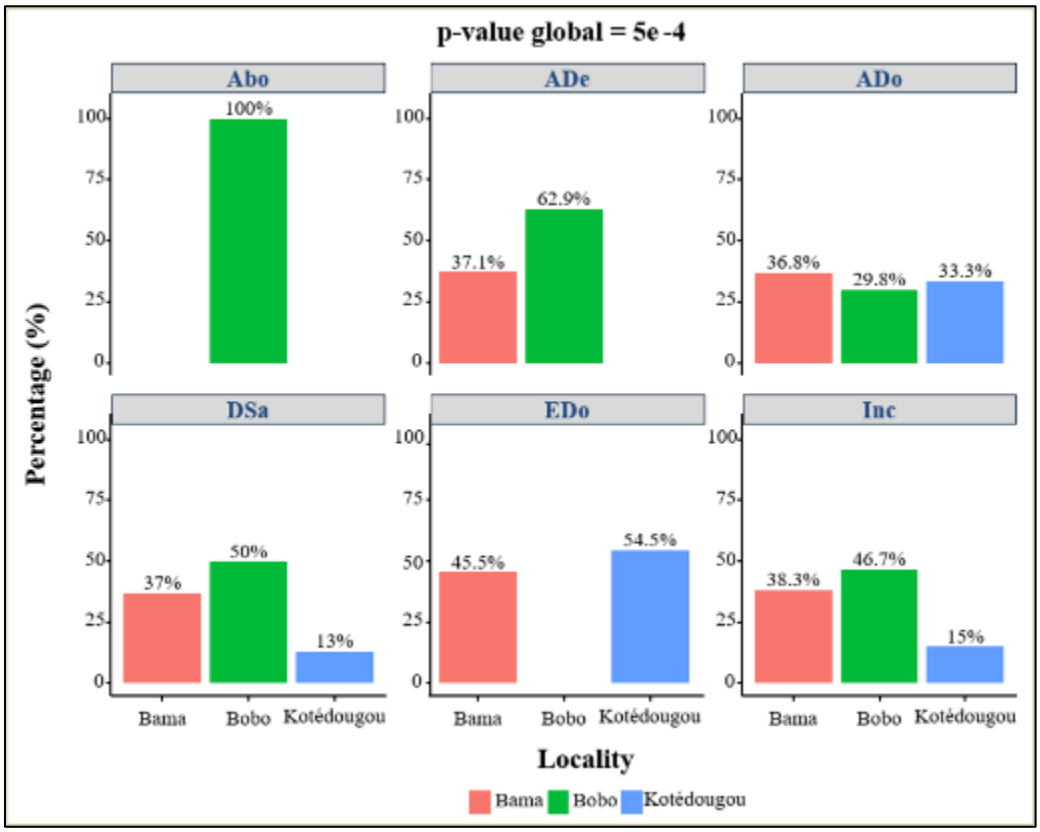


Figure 3 Socio-occupational profile of the populations surveyed

3.2. Management of organic waste

3.2.1. Distribution of waste management methods by locality

Comparative analysis of percentages of waste management adoption revealed significant differences between localities, as indicated by the overall test value (p-value = 5e-4) (Figure 4). These discrepancies revealed distinct behaviors depending on the respondents' place of residence.



Subscription to the collection service (Abo), waste disposal (Ade), home heap (Ado), wild deposit (DSa), home burial (Edo) and incineration (Inc).

Figure 4 Proportion of different waste management modes by locality

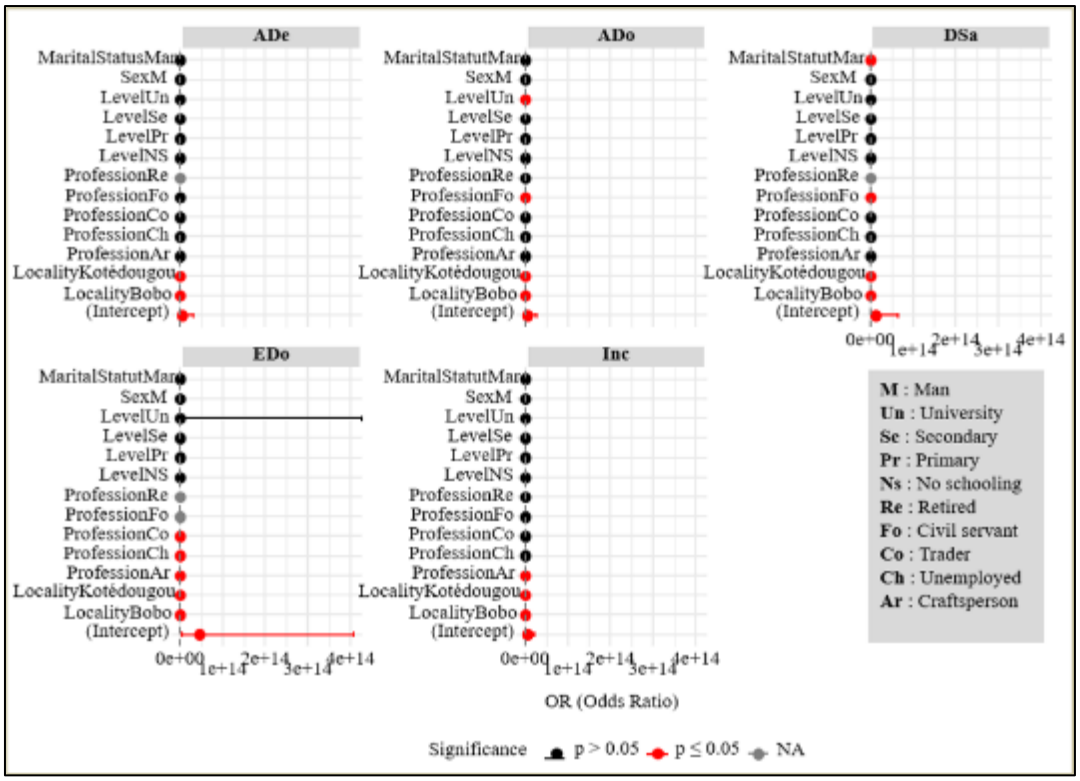
All households reporting a subscription to a resident formal service in Bobo-Dioulasso. For the waste disposal modality (Ade), Bobo-Dioulasso remained the majority with 62.9%, compared to 37.1% in Bama. Regarding home stacking (Ado), the results were more balanced between the three localities. Bama accounted for 36.8 per cent, Bobo-Dioulasso 29.8 per cent and Kotedougou 33.3 per cent. This distribution. The wild deposit modality (DSa) also showed dominance of this practice at the Bobo-Dioulasso level with 50%, followed by Bama with 37% and Kotedougou with 13%. For home burial (Edo), Kotédougou and Bama had similar percentages, respectively 54.5% and 45.5%. Finally, the incineration modality (Inc) was distinguished by a predominance of Bobo-Dioulasso with 46.7%, followed by Bama with 38.3% and Kotedougou with 15%.

3.2.2. Analysis of socio-demographic determinants of waste management practices

The analysis of odds ratios made it possible to evaluate the influence of socio-demographic characteristics on the different modalities studied (Figure 5). The results showed significant effects for some variables, including locality, while other factors, such as gender, marital status, educational level or occupation, did not have a statistically significant influence on waste management practices ($p > 0.05$).

In all models, the locality of Bobo-Dioulasso was the most important variable. The coefficients associated with this locality were significantly different ($p \leq 0.05$) for ADe, ADo, DSa, EDo and Inc, indicating that individuals residing in Bobo-Dioulasso had a significantly higher probability of belonging to these categories compared to those in other localities. Conversely, the locality of Kotedougou did not have a significant effect on many models. This was in line with the low proportions noted for this locality in previous graphic representations.

Other explanatory variables such as education level, marital status, occupation or sex (M) did not show a significant effect on the different modalities. Confidence intervals encompassing value 1 indicated that these factors did not significantly alter the probability of belonging to a given category. Thus, the waste management practices studied were more dependent on the geographical factor than on individual characteristics.



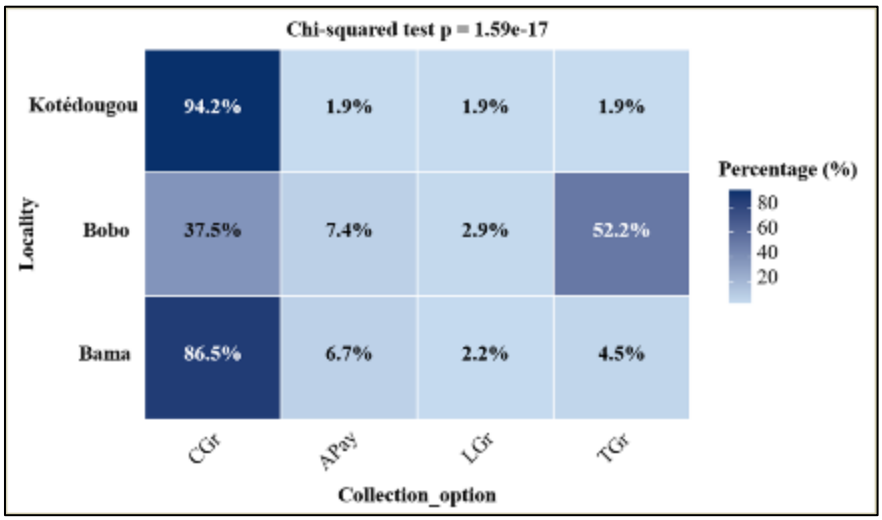
Subscription to the collection service (Abo), waste disposal (Ade), home heap (Ado), wild deposit (DSa), home burial (Edo) and incineration (Inc).

Figure 5 Multivariate analysis of determinants of waste management practices

3.2.3. Household preferences for waste collection methods

The chi-square test with a p=1.59e-17 value revealed highly significant differences between the three localities (Figure 6). Kotedougou showed remarkable adherence to composting with free removal and remuneration with 94.2% of

households. Bama has a similar profile with 86.5% for composting with free removal and remuneration, while Bobo stands out for a greater diversity: 52.2% of the inhabitants prefer free sorting and 37.5% composting. The paid subscription was the option that generated less enthusiasm than free composting and sorting in these three localities with a maximum of 7.4% in Bobo. Vermicomposting with free pick-up and remuneration with 1.9, 2.9 and 2.2% respectively for Kotedougou, Bobo and Bama were the least appreciated. Composting and vermicomposting operations shall result in a paid removal of the products.

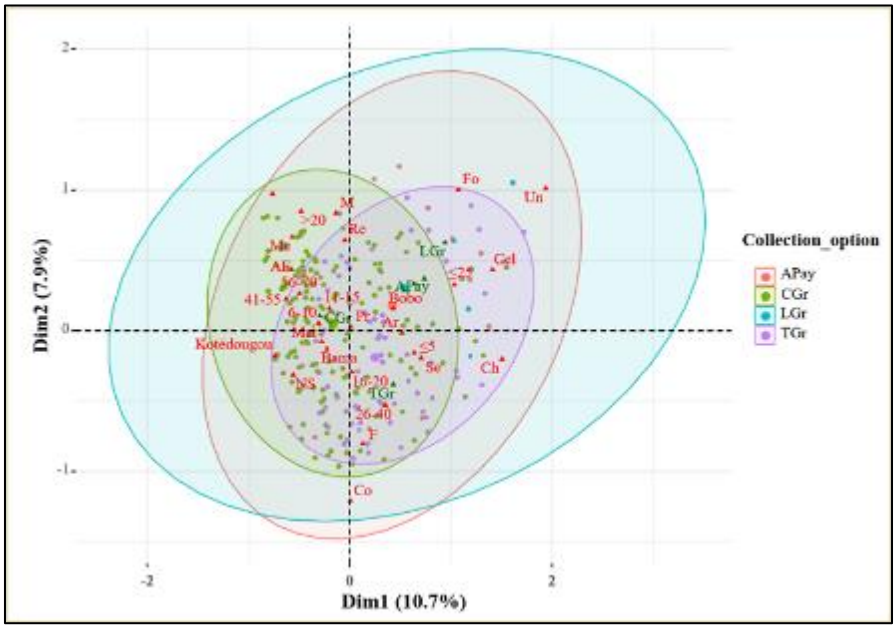


Composting with free removal and remuneration (CGr), waste sorting with free removal (TGr), vermicomposting with free removal and remuneration (LGr) and paid subscription to the collection service (Apay).

Figure 6 Waste collection method by location

3.2.4. Profiles of respondents regarding waste collection options

Principal component analysis revealed the multidimensional structure of waste collection preferences in the three locations studied (Figure 7). The first two axes account for 18.6% of the total variance, of which 10.7% for the first dimension and 7.9% for the second, reflecting a strong heterogeneity of behaviors and the complexity of the determinants of household choices.



Sorting with free removal (TGr), paid subscription (Apay), composting with free and paid removal (CGr), vermicomposting with free and paid removal (LGr), university (One), single (Cel), unemployed (Ch), shopkeeper (Co), housewife (F), craftsman (Ar), out of school (Ns), primary level (Pr), secondary level (Se), medersa level (Me), married (Mar) and retired (Re).

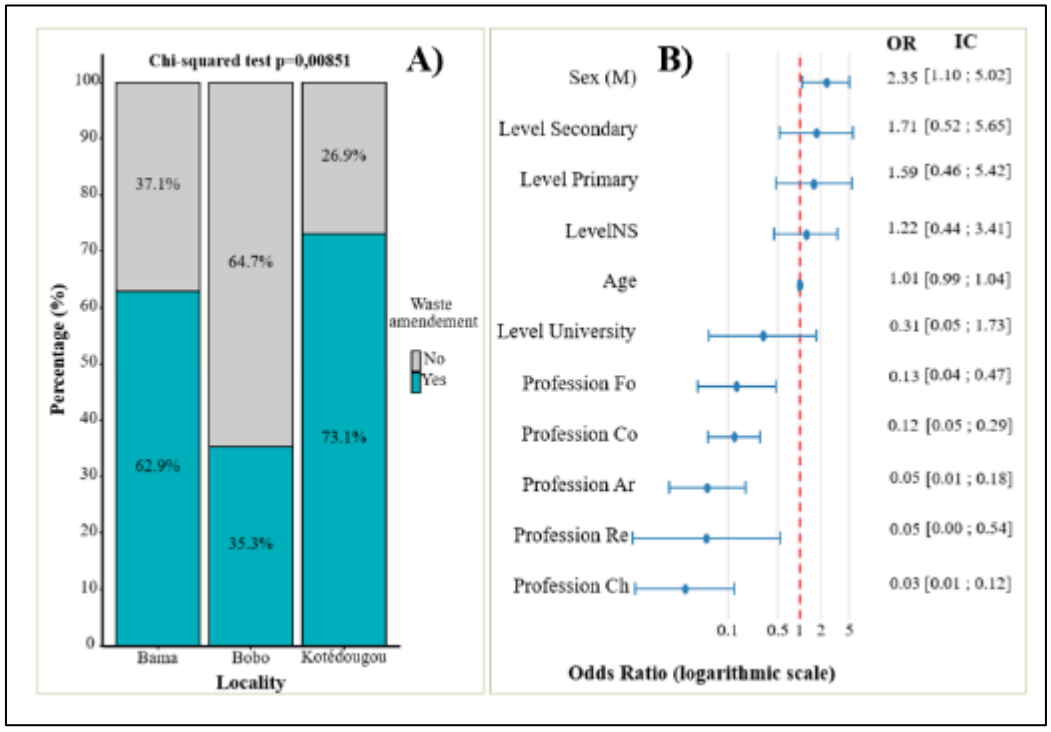
Figure 7 Factor analysis of waste collection preferences

Dimension 1 contrasts two sets of collection modalities. The positive pole brings together options with a more urban character, such as free sorting (TGr) and paid subscription (Apay), associated with university profiles (One), single (Cel) and unemployed (Ch). Conversely, the negative pole brings together composting with free removal and remuneration (CGr) and vermicomposting with free removal and remuneration (LGr), linked to traders (Co), housewives (F), craftsmen (Ar), out-of-school (Ns), primary (Pr), secondary (Se) and medersa (Me) levels, as well as married people (Mar) and retired people (Re), generally having spaces favorable to the recovery of organic waste.

Dimension 2 distinguishes localities according to their degree of urbanization. Kotédougou and Bama are positioned on the side of composting and agricultural or artisanal profiles, while Bobo presents a wider dispersion, combining composting practices and more modern sorting methods. The strong superposition of the confidence ellipses of Kotedougou and Bama reflects similar socio-economic characteristics, while the larger ellipse of Bobo reflects a more marked social heterogeneity.

3.2.5. Socio-demographic determinants of raw field waste use

The analysis of the practices of using raw waste as an amendment shows significant differences between localities and the influence of socio-demographic parameters (Figure 8). In Kotedougou, nearly three quarters of households use their waste to fertilize the soil, 73.1%, compared to 62.9% in Bama and only 35.3% in Bobo-Dioulasso, which is more urbanized. Men, with an odds ratio of 2.35, are twice as likely as women to apply this practice. Those who have reached primary or secondary level also show a strong adherence with an odds ratio of 1.59 and 1.71, while those who are not in school are slightly less engaged with an odds ratio of 1.22. Conversely, academics, with an odds ratio of 0.31, civil servants, 0.13, and traders, 0.12, rarely use their waste as fertilizer. Artisans and pensioners have an odds ratio of 0.05 each. Age does not influence this practice, all generations participate in a similar way.



M (male), Fo (civil servant), Ns (Out of school), Co (shopkeeper), Ar (craftsman), Re (retired), Ch (unemployed)

Figure 8 Socio-demographic factors associated with the use of waste as an amendment

4. Discussion

4.1. Socio-demographic characterization of respondents in the three localities

The significant variation in marital status between localities, with a lower proportion of married people in Bobo-Dioulasso, reflects social dynamics differentiated between urban and rural areas. According to (Shapiro & Gebreselassie, 2014), urbanization in West Africa is accompanied by a transformation of matrimonial calendars, with a delay in age at marriage and an increase in celibacy, particularly among educated people. This trend is due to longer education, career

aspirations and greater residential autonomy in urban areas. The observed educational gradient, with a higher concentration of university levels in Bobo-Dioulasso and a predominance of out-of-school students in rural areas, reflects economic constraints and agricultural labor needs more than mere inequalities in educational infrastructure (Sanfo, 2023). This reality is consistent with the observations of several studies on rural education in West Africa, including those of Jabbarian *et al.*, 2022.

The predominance of livestock farmers in the three sites, particularly in Kotedougou, reveals the persistence of the agricultural economy as a basis for productive activities, even in peri-urban areas. This occupational structure is part of the national context in Burkina Faso where, according to INSD (2020), agriculture still occupies more than 70% of the active population. The more marked professional diversification in Bobo-Dioulasso, with a significant representation of traders, craftsmen and civil servants, testifies to the role of regional economic pole of this city. The absence of certain socio-professional categories, such as retirees in Kotedougou, reflects the structural realities of the local labor market. Sié *et al.* (2010) have shown that most agricultural workers continue to work as long as their health permits, without a formal transition to pensioner status.

4.2. Organic waste management in the different localities

The results show that locality is the main determinant of organic waste management methods, going beyond the influence of individual characteristics. This reflects disparities in access to collection services along the rural-urban gradient. In urban areas, the coexistence of formal services and informal practices illustrates system failures despite the presence of infrastructure, while in peri-urban and rural areas, such as Kotedougou and Bama, access to basic services remains very limited (UN-Habitat, 2021). Mukwevho *et al.*, (2024) emphasizes that waste management in Africa requires a systemic approach that takes into account local realities, beyond financial or infrastructural constraints alone.

The lack of a significant effect of gender, education, marital status and occupation confirms that practices are primarily determined by the availability or absence of services rather than by individual characteristics (Guerrero *et al.*, 2013). This observation has direct implications for public policies: improving waste management requires investment in collection infrastructure and services as a priority. However, some individual factors, such as income, knowledge of waste impacts and household size, may become relevant when setting up new services.

Moreover, the persistence of informal practices, such as uncontrolled dumping and incineration at home, even in urban areas, reveals the structural limitations of collection systems. These practices expose populations to major environmental and health risks, including dioxin and furan air pollution and increased respiratory diseases (Jiang *et al.*, 2024). The rapid growth in waste production, such as in Ouagadougou where volumes have tripled in ten years, accentuates these challenges and underlines the urgency of strengthening municipal services and sustainable management strategies.

4.3. Household preferences for organic collection and recovery methods

The low take-up of composting with free removal and remuneration in rural and peri-urban areas reflects both the recognition of the agronomic value of organic waste and the economic constraints limiting access to paid services. Organic soil improvers from household waste are an effective alternative to chemical fertilizers, restoring soil fertility and reducing agricultural costs (Ouerriemmi *et al.*, 2021). The low interest in vermicomposting can be explained by the lack of knowledge of this technique and the lack of specific training, which is in line with the conclusions of Lim *et al.* (2015) on cognitive and institutional barriers to the adoption of innovative practices in rural areas.

In urban areas, the diversity of preferences reveals a social heterogeneity typical of African secondary cities. The factor analysis highlights the coexistence of two logics: a modern approach supported by educated and environmentally sensitive populations, oriented towards selective sorting, and a traditional approach focused on the agricultural recovery of organic waste (Domínguez & Edwards, 2011). This duality also reflects the widespread practice of urban and peri-urban agriculture, which creates local demand for organic amendments and promotes the recovery of organic waste at the domestic level (Arosemena *et al.*, 2024).

Finally, the low use of paid subscriptions reflects the economic constraints of households in African secondary cities. Waste management costs remain constrained by municipal budgets and the low purchasing power of populations, confirming the need to promote free or low-cost alternatives, such as composting or community vermicomposting (Guerrero *et al.*, 2013). However, the promotion of vermicomposting requires technical support and appropriate training programs to overcome cognitive barriers and promote the sustainable adoption of this practice (Lim *et al.*, 2015 ; Domínguez & Edwards, 2011).

4.4. Use of raw waste as an amendment and policy implications

The use of raw waste as an amendment has a clear gradient, decreasing from rural to urban areas. This is due to several interrelated factors: the proximity of farms, the availability of space for storage and processing, and the central role of agriculture in the local economy. Drechsel and Kunze (2001) showed that urban and peri-urban agriculture in West Africa largely mobilizes organic waste as a source of nutrients, due to limited access to chemical fertilizers. Somé *et al.* (2017) observed that urban market gardeners in Ouagadougou actively valorize household waste despite health risks, including this practice in adaptation strategies to soil degradation. The decline in soil fertility is a major constraint for agricultural production in Burkina Faso, justifying the use of organic amendments (Lompo *et al.*, 2012).

Socio-professional profiles strongly influence this practice. Men and people who have reached primary or secondary level show higher adherence, in connection with their direct involvement in agricultural activities and their empirical knowledge of the benefits of organic matter. Conversely, academics, civil servants and traders make little use of raw waste, due to the remoteness of agricultural activities, better perception of health risks and easier access to chemical fertilizers. Cofie *et al.* (2006) warn of the risks of contamination by pathogens and heavy metals during the direct use of uncomposted waste, risks better perceived by educated populations. The absence of an effect of age shows that this practice is intergenerational and rooted in local knowledge, an asset for the development of value chains while requiring improvements to limit health risks.

These observations have direct implications for waste management policies. The study highlights the need to adopt differentiated approaches according to the rural-urban gradient. In urban areas, the strengthening of formal collection infrastructure must be coupled with the development of sorting at source in order to recover organic waste. In peri-urban areas, hybrid systems combining formal collection and local composting seem more suitable. In rural areas, priority must be given to the enhancement and safety of existing practices through technical training. The strong adherence to composting with free removal and remuneration is a strategic opportunity to develop value chains adapted to the Burkinabe context. Manga *et al.* (2008) recommend that Community initiatives be accompanied by technical training and guaranteed business opportunities to ensure their sustainability. The sorting center model developed by CEAS-Burkina could be replicated in other secondary cities to maximize efficiency.

5. Conclusion

This research aimed to identify the determinants of organic waste management practices and to assess households' willingness to adopt sustainable methods of recovery along the rural-urban gradient in the Guiriko region of Burkina Faso. The challenge was to understand why certain practices persist or emerge differently according to geographical and socio-demographic contexts. The results reveal three major findings. First, locality is the primary determinant of management patterns with $p < 0.001$, far outweighing individual sociodemographic characteristics such as sex, marital status, educational attainment and occupation that have no significant effect with $p > 0.05$. Bobo-Dioulasso monopolizes the formal subscription at 100% but also has the highest rate of informal practices with 50% of wild deposits and 46.7% of incineration. Second, preferences for collection patterns vary significantly by urbanization gradient with $p = 1.59e-17$. Kotédougou at 94.2% and Bama at 86.5% favor composting with free removal and remuneration, while Bobo splits between free sorting at 52.2% and composting at 37.5%. Vermicomposting remains low everywhere between 1.9 and 2.9%. Thirdly, the use of raw waste as an amendment shows a marked rural-urban gradient with 73.1% in Kotedougou, 62.9% in Bama and 35.3% in Bobo, significantly influenced by gender with OR = 2.35 for men, education level with OR = 1.59-1.71 for primary-secondary levels and occupation with OR < 0.31 for academics and civil servants.

These results enrich the understanding of waste management in sub-Saharan Africa by revealing that the failure of current systems is not due to a lack of citizen engagement but to an inadequacy between available infrastructure and territorial needs. The strong disposition to composting with free removal and remuneration is an untapped strategic lever to develop circular channels adapted to local realities. The study also shows that uniform policies fail in the face of heterogeneous contexts. Thus, each territory requires specific solutions to enhance existing practices. These findings call into question the top-down approach that dominates waste management policies and call for the territorialization of intervention strategies.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Amenta, L., Attademo, A., Remøy, H., Berruti, G., Cerreta, M., Formato, E., Palestino, M. F., & Russo, M. (2019). Managing the Transition towards Circular Metabolism: Living Labs as a Co-Creation Approach. Urban Planning, 4(3), 5-18. https://doi.org/10.17645/up.v4i3.2170

[2] Arosemena, J., Toboso-Chavero, S., Adhikari, B. et Villalba, G. (2024). Boucler le cycle des nutriments en milieu urbain : l'utilisation des déchets solides municipaux dans l'agriculture périurbaine et urbaine. Waste management, 183, 220-231. https://doi.org/10.1016/j.wasman.2024.05.009 .

[3] Cofie, O. O., Agbottah, S., Strauss, M., Esseku, H., Montangero, A., Awuah, E., & Kone, D. (2006). Solid–liquid separation of faecal sludge using drying beds in Ghana: Implications for nutrient recycling in urban agriculture. Water Research, 40(1), 75-82. https://doi.org/10.1016/j.watres.2005.10.023

[4] Comité National du Recensement. (2022). Cinquième Recensement Général de la Population et de l'Habitation du Burkina Faso (Synthèse des résultats définitifs No. 5; p. 133). Comité National du Recensement, Ouagadougou, Burkina Faso.

[5] Dolui, S., & Sarkar, S. (2023). Assessment of LULC Changes and Its Impact on Agricultural Landscape in Peri-urban Space of Bolpur Town, West Bengal (India). Dans U. Chatterjee, N. Bandyopadhyay, M. D. Setiawati, & S. Sarkar (Éds.), Urban Commons, Future Smart Cities and Sustainability (pp. 341-373). Springer International Publishing. https://doi.org/10.1007/978-3-031-24767-5_16

[6] Domínguez, J., & Edwards, C. A. (2011). Relationships between composting and vermicomposting. Dans C. A. Edwards, N. Q. Arancon, & R. L. Sherman (Éds.), Vermiculture technology: Earthworms, organic wastes, and environmental management (pp. 11-26). CRC Press.

[7] Drechsel, Pay, et al., éditeurs. Waste Composting for Urban and Peri-Urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. CABI, with International Water Management Institute, Food and Agriculture Organization of the United Nations, 2001. CABI Books. K10plus ISBN.

[8] Ferronato, N., & Torretta, V. (2019). Waste Mismanagement in Developing Countries: A Review of Global Issues. International Journal of Environmental Research and Public Health, 16(6), 1060. https://doi.org/10.3390/ijerph16061060

[9] Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. Waste Management, 33(1), 220-232. https://doi.org/10.1016/j.wasman.2012.09.008

[10] Ho., J., & S., A. (1970). Les minorités ethniques avant et après la deuxième guerre en Europe centrale. Population (French Edition), 25(5), 1093. https://doi.org/10.2307/1530313

[11] INSD - Institut National de la Statistique et de la Démographie. (2020). Annuaire statistique 2019. INSD, Ouagadougou, Burkina Faso.

[12] Institut National de la Statistique et de la Démographie. (2019). Tableau de bord social du Burkina Faso 2019. INSD, Ouagadougou, Burkina Faso.

[13] Jabbarian, J., Werner, L. K., Kagoné, M., Lemp, J. M., McMahon, S., Horstick, O., Kazianga, H., Kobiané, J.-F., Fink, G., & De Neve, J.-W. (2022). "It's the poverty"—Stakeholder perspectives on barriers to secondary education in rural Burkina Faso. PLOS ONE, 17(11), e0277822. https://doi.org/10.1371/journal.pone.0277822

[14] Jiang, Y., Guo, H., Chen, K., Fei, X., Li, M., Ma, J. et He, W. (2024). Évaluation des risques sanitaires liés aux éléments potentiellement toxiques présents dans le sol et le riz des rizières typiques de la province du Henan. Toxics , 12 (11), 771. https://doi.org/10.3390/toxics12110771

[15] Kar, M. (2022). From Utilitarian to Hedonic Consumer Behavior: An Evaluation for the Socio-Digital Age. Dans P. Keikhosrokiani (Éd.), Advances in Marketing, Customer Relationship Management, and E-Services (pp. 374-392). IGI Global. https://doi.org/10.4018/978-1-6684-4168-8.ch016

[16] Kumari, T., & Raghubanshi, A. S. (2023). Waste management practices in the developing nations: Challenges and opportunities. Dans Waste Management and Resource Recycling in the Developing World (pp. 773-797). Elsevier. https://doi.org/10.1016/B978-0-323-90463-6.00017-8

[17] Lim, S. L., Lee, L. H., & Wu, T. Y. (2015). Sustainability of using composting and vermicomposting technologies for organic solid waste biotransformation: Recent overview, greenhouse gases emissions and economic analysis. Journal of Cleaner Production, 111, 262-278. https://doi.org/10.1016/j.jclepro.2015.08.083

[18] Lompo, F., Bonzi-Coulibaly, Y. L., Yonkeu, S., Doamba, S. W. F., & Nandkangré, H. (2012). Influence de la fumure organique sur la solubilisation du phosphore du Burkina Phosphate dans deux types de sol du Burkina Faso. Tropicultura, 30(2), 87-93.

[19] MAAH - Ministère de l'Agriculture et des Aménagements Hydrauliques. (2020). Annuaire statistique de l'agriculture 2019. MAAH, Ouagadougou, Burkina Faso.

[20] Maalouf, A., & Mavropoulos, A. (2023). Re-assessing global municipal solid waste generation. Waste Management & Research: The Journal for a Sustainable Circular Economy, 41(4), 936-947. https://doi.org/10.1177/0734242X221074116

[21] Makan, A., Fadili, A., & Oubenali, M. (2020). Interaction of physicochemical parameters during pressurized in-vessel composting of food waste. Bioresource Technology Reports, 10, 100350. https://doi.org/10.1016/j.biteb.2019.100350

[22] Malter, M. S., Holbrook, M. B., Kahn, B. E., Parker, J. R., & Lehmann, D. R. (2020). The past, present, and future of consumer research. Marketing Letters, 31(2-3), 137-149. https://doi.org/10.1007/s11002-020-09526-8

[23] Manga, V. E., Forton, O. T., & Read, A. D. (2008). Waste management in Cameroon: A new policy perspective? Resources, Conservation and Recycling, 52(4), 592-600. https://doi.org/10.1016/j.resconrec.2007.07.003

[24] Mukwevho, P., Radzuma, P. et Roos, C. (2024). Exploration des obstacles à la mise en œuvre efficace des plans de gestion intégrée des déchets dans les économies en développement : leçons tirées des municipalités sud-africaines. Sustainability . https://doi.org/10.3390/su16229643 .

[25] ONU-Habitat. (2021). L'état des villes africaines 2021 : Vers un avenir urbain durable pour tous. Programme des Nations Unies pour les établissements humains. https://unhabitat.org/fr/node/94584

[26] Oueriemmi, H., Kidd, P., Trasar-Cepeda, C., Rodríguez-Garrido, B., Zoghlami, R., Ardhaoui, K., Prieto-Fernández, Á. et Moussa, M. (2021). Évaluation des déchets organiques compostés et du fumier de ferme pour améliorer la fertilité des sols sableux pauvres dans les régions arides. Agriculture , 11, 415. https://doi.org/10.3390/agriculture11050415 .

[27] Pandey, B. K., Nassa, V. K., Pandey, D., George, A. S., Gupta, M., Dadheech, P., & George, A. S. H. (2023). An Analytical Analysis of the Present-Day Procedures for Disposing of Waste. Dans P. Srivastava, D. Ramteke, A. K. Bedyal, M. Gupta, & J. K. Sandhu (Éds.), Practice, Progress, and Proficiency in Sustainability (pp. 24-34). IGI Global. https://doi.org/10.4018/978-1-6684-8117-2.ch002

[28] Sanfo, J.-B. M. B. (2023). Factors explaining rural-urban learning achievement inequalities in primary education in Benin, Burkina Faso, Togo, and Cameroon. International Journal of Educational Research Open, 4, 100234. https://doi.org/10.1016/j.ijedro.2023.100234

[29] Shapiro, D., & Gebreselassie, T. (2014). Marriage in Sub-Saharan Africa: Trends, Determinants, and Consequences. Population Research and Policy Review, 33(2), 229-255. https://doi.org/10.1007/s11113-013-9287-4

[30] Sié, A., Louis, V. R., Gbangou, A., Müller, O., Niamba, L., Stieglbauer, G., Yé, M., Kouyaté, B., Sauerborn, R., & Becher, H. (2010). The Health and Demographic Surveillance System (HDSS) in Nouna, Burkina Faso, 1993–2007. Global Health Action, 3(1), 5284. https://doi.org/10.3402/gha.v3i0.5284

[31] Somé, Y., Kangambéga, E., Béné, A. et Diendéré, I. (2017). Les déterminants du choix des conteneurs plastiques dans la production des plantes à Ouagadougou (Burkina Faso) : une contribution à la gestion des déchets plastiques. Journal international des sciences biologiques et chimiques , 10, 2637-2645. https://doi.org/10.4314/ijbcs.v10i6.18 .

[32] Taghipour, H., Amjad, Z., Aslani, H., Armanfar, F., & Dehghanzadeh, R. (2016). Characterizing and quantifying solid waste of rural communities. Journal of Material Cycles and Waste Management, 18(4), 790-797. https://doi.org/10.1007/s10163-015-0365-z

[33] Van Wettere-Verhasselt, Y. (1969). Bobo-Dioulasso: Le développement d'une ville d'Afrique occidentale. Cahiers d'outre-mer, 22(85), 88-94. https://doi.org/10.3406/caoum.1969.4174

[34] Yazid, N., Barrena, R., Komilis, D., & Sánchez, A. (2017). La fermentation en milieu solide comme nouveau paradigme pour la valorisation des déchets organiques : une revue. Sustainability , 9, 224. https://doi.org/10.3390/su9020224 .