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Legal, Regulatory, and Institutional Aspects of Municipal Solid Waste Management in Bangui, Central African Republic: A Critical Analysis of the Current Situation

Herbert Corneil Mbambali Mbaye[1,2], Elhadji Mamadou Sonko[1*], Issakha Fofana[1], Diomaye Dieng[1]

[1]Institute of Environmental Sciences, Faculty of Science and Technology, Cheikh Anta Diop University of Dakar, Dakar, Senegal
[2]Directorate of New and Renewable Energies, Ministry in Charge of Energy Development and Hydraulic Resources, Bangui, Central African Republic
Email: *elhadjimamadou.sonko@ucad.edu.sn

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Abstract

This article analyzes solid waste management in Bangui, focusing on legal, regulatory, and institutional aspects. The methodology is based on an analysis of data collected from a literature review and from semi-structured interviews with stakeholders in solid waste management. Field observations were used to verify some of the information obtained from the interviews. The results highlight a multitude of stakeholders, characterized by a notable lack of effective coordination. This fragmentation among stakeholders hinders the effectiveness of waste management in Bangui. From a legal and regulatory perspective, the findings reveal a wide range of legal texts, most of which are not specific to household solid waste management. Furthermore, there is a lack of implementing regulations for certain laws. This study highlights the need for effective coordination and institutional capacity building, as well as the use of sustainable technological innovations and the exploration of new approaches to mobilizing financial resources. Ultimately, an integrated approach, with the active participation of all stakeholders, could be the solution for sustainable waste management in Bangui.

Keywords

Bangui, Central African Republic, Institutional Aspects, Legal Aspects, Municipal Solid Waste, Waste Management

1. Introduction

The issue of household waste management (HW) is increasingly prominent in current environmental concerns due to the complex nature of processing this waste and its far-from-negligible impact on the environment [1] [2]. As human activities intensify, the volume of waste generated increases proportionally [3]. This dynamic reflects the deep urban, economic, and social transformations taking place in these cities. Consequently, highly urbanized environments with numerous and diverse activities naturally produce more waste than rural environments with fewer activities [4]. The history of waste generation reveals that high levels of urbanization, sustained urban growth, and an increasing number of residential neighborhoods remain proportional to poor sanitation quality and standard of living if appropriate measures are not taken [5].

Furthermore, the advent of decentralization materialized through the transfer of powers from the central government to local authorities without providing the necessary financial resources. This is the case for the municipality of Bangui which, like many other African cities, lacks the infrastructure and financial resources to cope with growing quantities of household solid waste. Weakness is also noted within the institutions in charge of waste management. Yet, institutions are essential to solid waste management because they guarantee stability, facilitate collaboration, lower transaction costs, settle disputes, and generate information. Indeed, the institutional framework is crucial for achieving policy outcomes that promote sustainability and interaction among stakeholders [6] [7]. The lack of awareness regarding laws among various stakeholders, including the public, also constitutes a major concern [8]. Failure to address these institutional and legal shortcomings could lead to poor waste management with devastating effects on human and environmental health [6]-[8].

All of this underscores the value of studying the legal and regulatory framework of waste management in Bangui. This is the goal of this research, which aims to characterize the legal and institutional framework of household solid waste management in Bangui by identifying its limitations to propose a sustainable management framework.

2. Materials and Methods

2.1. Presentation of the City of Bangui, Study Site

2.1.1. Location, Administrative Framework, and Demographics

The city of Bangui—a colonial post established on June 26, 1889, that became the capital of Ubangi-Shari in 1906—was established as a municipality in 1911 and became the political and economic capital of the Central African Republic in 1958 [9]. It is bordered to the north by the commune of Begoua (located 10 kilometers from the city center), to the south by the Ubangi River (which forms the border with the Democratic Republic of the Congo, DRC), to the west by the urban commune of Bimbo (located 7 kilometers from the city center), and to the east by the rural commune of Landja [10].

Founded downstream from the Ubangi rapids, Bangui's urban area expands westward in a broad triangle open between the hills and the river on the M'Poko plain. The city's expansion currently continues along the Damara Road to the northwest and upstream from the rapids toward Landja. According to cadastral services, Bangui covers an area of 150 km2 across four sub-prefectures (Bangui-Rapides, Bangui-Fleuve, Bangui-Centre, and Bangui-Kagas). It is made up of ten (10) districts (**Figure 1**), with an estimated population of approximately 1.5 million inhabitants, representing 23.4% of the nation's total population [11]. The city center, restricted to administrative offices and high-ranking officials' residences, contrasts with peripheral neighborhoods lacking infrastructure where the road network is practically limited to the main arterial roads connecting the capital to surrounding villages [12].

Bangui is a riverine border city adjacent to Zongo (DRC). Over 65% of the built area consists of informal settlements that are quite dense near the city center and less dense in newer areas [12]. The average household size is 6 people [11].

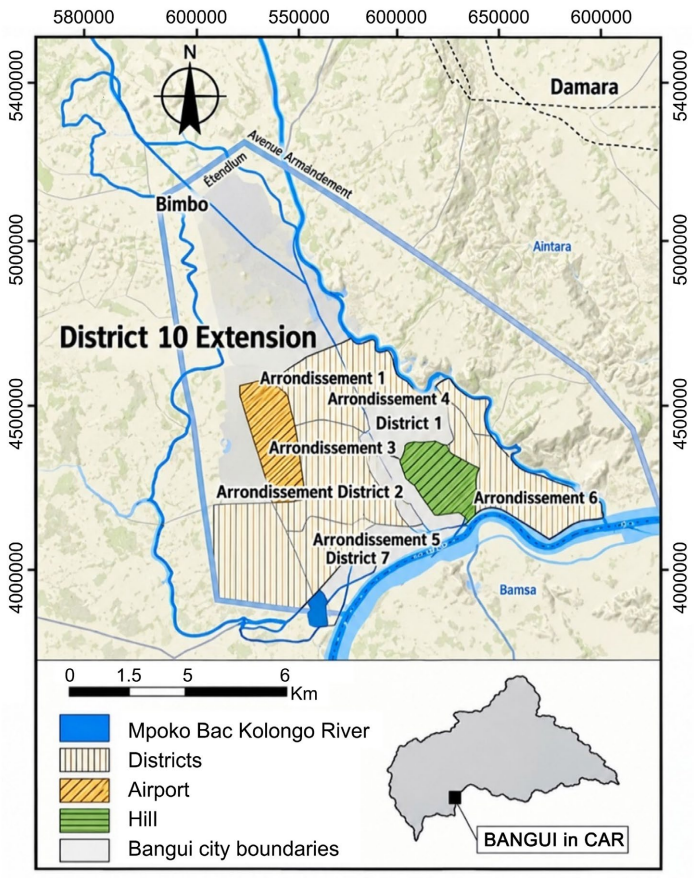


Figure 1. Map of the City of Bangui (Source: Herbert Corneil Mbambali Mbaye, August 2025).

2.1.2. Climate, Topography, and Hydrography

The Bangui features an equatorial climate with two alternating seasons: a rainy season extending from May to mid-November and a dry season spanning mid-

November through late April. Average rainfall in Bangui ranges between 1420 and 1537 mm. Bangui's monthly rainfall regimen shows significant variation: peak rainfall occurs in August with 231 mm, while the minimum is recorded in January at 19 mm. The annual average maximum temperature is 32.4˚C, with moderate variances between minimums and maximums (11.2˚C). Humidity levels exceed 50%, except in mid-January and February when humidity drops below 50%. Overall, Bangui lies within a low-altitude climate zone [11] with favorable agro-ecological conditions for agriculture and livestock [13].

The terrain consists of three (3) topographic units: hills, the plain, and the Ubangi River. The hills constitute one of the three main topographic units of Bangui and include protected areas where development is restricted [14]. They feature flat, plateau-like summits of Precambrian basement formations covered by pristine tropical forests, with hill alignments generally oriented North-North-East to South-South-East, ranging in altitude between 500 and 700 meters (Lower-Ubangi hills, referred to as Panther Hills and Daouba-Kassaï Hills) [15]. These hills are separated by a depression known as the "Ndrès Corridor," characterized by elevations ranging from 350 to 460 meters. Overall, Bangui acts as a transition zone between rainforest and pre-forest savanna [9]. The plain is largely covered by alluvial formations (pale gray clay and sandy silt layers), exposing no bedrock [15]. It extends westward to the M'Poko River [16], which serves as its natural boundary. The Ubangi River is the most prominent element in the city's hydrographic network, originating at the confluence of the Mbomou and Uele rivers along with several other streams (Kouango, Bougba, Nguito, Sapekê, Ngoubagara) [17]. It flows southwest of the city, joining the Congo River on its right bank after 500 kilometers.

2.2. Methodological Approachs

The methodological approach comprised a literature review, field observations, and semi-structured interviews with institutions involved in the household solid waste management chain. The literature review involved examining relevant articles, dissertations, theses, and reports. National legal documents were gathered from the Ministries of Territorial Administration, Decentralization and Local Development; Environment and Sustainable Development; Health and Population; as well as from the central municipality and district communes of Bangui. International conventions, such as the Basel and Bamako Conventions on waste management, were also utilized alongside specific policy documents from involved entities. Field visits and observations helped clarify operational practices within these institutions, grouping points, informal dumpsites, and the Kolongo sanitary landfill site.

Interviews followed a semi-structured format targeting administrative bodies (decentralized/regional directorates), the Bangui Municipality, district communes, and private entities. Administrators were asked about the effectiveness of waste management laws, implementation difficulties, legal/institutional gaps, and corrective measures. Private operators were interviewed regarding their activities,

operational challenges, and motivations in the waste sector. Table 1 provides an overview of the interviewees and their operating scope across regional, municipal, or sector levels. The interviewees were purposively selected based on their institutional responsibilities and direct involvement in municipal solid waste management. Interview responses and field observations were analyzed thematically and compared with documentary evidence to identify convergences and discrepancies between the institutional framework and waste management practices.

Table 1. Number of persons interviewed across various institutions.

Type of institution/stakeholder	Name of institution/stakeholder	Number	Scope of intervention
State institutions	Ministry in charge of territorial administration, decentralization, and local development	1	Regional & municipal
	Ministry in charge of environment and sustainable development	1	Regional & municipal
	Ministry of health and population	1	Regional & municipal
Municipality	Bangui municipality and district communes	8	Municipal
	Directorate of major municipal works	1	Municipal
	Directorate of environmental police	1	Municipal
Non-governmental organizations	Non-governmental organizations (NGOs)	3	Municipal/sector
Community associations	Community associations	4	Sector/neighborhood
Informal waste collectors	Informal waste collectors (Recyclers)	7	Sector/neighborhood
Households	Households	90	Neighborhood

3. Results and Discussion

3.1. Stakeholders and Their Roles in Waste Management in Bangui

Household solid waste management in Bangui involves a multitude of stakeholders, each fulfilling a specific role within the management chain (Table 2) [18]. The primary stakeholders are state institutions, including the Ministries of Territorial Administration, Decentralization and Local Development; Environment and Sustainable Development; Health and Population; municipal and district communes; decentralized regional directorates; private enterprises; NGOs; community associations; informal collectors; and individual households [18].

Table 2 demonstrates a plurality of waste management actors in Bangui, similar to findings reported by Bonkoungou [18] in Koudougou, Burkina Faso. This multiplicity reflects the inherent complexity of the waste sector. In Bangui, public

authorities are responsible for municipal solid waste management regarding collection (from administrations, public markets, etc.), transportation, and final disposal. However, public authorities do not intervene in pre-collection, which is handled by private collectors or community-based organizations (CBOs).

Table 2. Stakeholders and their roles in Bangui's waste management chain.

Stakeholders	Roles	Scope of intervention
State institutions		
Ministry in charge of territorial administration, decentralization, and local development	Oversees the municipality and local authorities. Holds jurisdiction over local/social neighborhood development, hygiene, sanitation, and supervising MSW collection, removal, and treatment. Supports local authorities in their development missions. Promotes citizen participation in local governance. Organizes and supports consultation frameworks for decentralization stakeholders at national and local levels.	Regional & municipal
Ministry in charge of environment and sustainable development	Implements national environmental policies. Supports local authorities in protecting the urban environment. Develops and assists local authorities in implementing national waste management strategies. Enforces regulatory and legislative texts governing pollution control in urban and rural areas.	Regional & municipal
Ministry of health and population	Supervises and plans public health policies and strategies through involvement in health-related aspects of waste.	Regional & municipal
Municipality		
Bangui municipality & district communes	Exercise local and territorial powers within municipal boundaries.	Municipal
Directorate of major municipal works	Participates in managing urban infrastructure and equipment for waste collection and disposal.	Municipal
Non-governmental organizations (NGOs)	Provide local public services, such as waste removal in certain underserved neighborhoods.	Sector/neighborhood
Community associations (neighborhood management committees)	Mobilize and raise awareness among populations regarding pre-collection and waste treatment.	Sector/neighborhood
Informal waste collectors	Promote green jobs through the expansion of the circular economy via source recycling and waste recovery.	Sector/neighborhood
Households	Participate in waste pre-collection and disposal at dumpsites or collection points.	Household/neighborhood

Operational intervention by the State is carried out through decentralized state bodies: the Directorate of Major Municipal Works (DGTM), the Directorate of Environmental Police (DPE), and regional directorates under the Ministry of Environment and Sustainable Development (MEDD), alongside sector-specific ministries enforcing national waste policies. The DGTM is responsible for executing planning guidelines and organizing municipal waste services (technical works, infrastructure maintenance, urban cleanliness). This central government presence in Bangui aligns with findings by Louis *et al.* [19] in other developing cities, where regional directorates and prefectural services operate based on jurisdictional scale. A similar structure exists in Cameroon, where Ngambi [20] notes that decentralized directorates oversee urban planning and waste management policies in Yaoundé. Likewise, research by Rouyat *et al.* [21] on waste management in secondary Senegalese towns highlights institutional actors (ministries) represented locally by decentralized directorates.

Furthermore, community-based organizational structures have emerged in Bangui since 2003, when they first entered community waste management. Distributed across all city sectors, they actively engage in household waste handling. Interviews indicate that these associations perform multiple roles; alongside pre-collection, several actively recover recyclable materials during collection rounds from subscribed households.

In this structure, the municipality and community associations receive support from national and international NGOs via funded projects designed to strengthen household waste systems. NGO and financial partner support extends beyond pre-collection associations to include municipal and district governments. Notable examples include the Emergency Urban Infrastructure Rehabilitation and Maintenance Project [22] for infrastructure rehabilitation and institutional capacity building, and the Promotion of Local Environmental Initiatives for Flood Management Project. Funded by the French Development Agency (AFD), aimed to improve municipal waste management by enabling stakeholders to exchange management mechanisms and build a shared vision around urban issues. This supported Law No. 21.001 of January 21, 2021 (Administrative Subdivisions) and Law No. 20.008 (Organization and Operation of Local Authorities), which amended Ordinance No. 88.006 of February 12, 1988, by assigning urban environmental management responsibilities to local bodies [18].

Informal actors remain active across Bangui. Described variously as "scavengers" or "ragpickers" [23], "barbesha" in Sfax [24], or "waste pickers" [25], these men, women, and children operate in largely unstructured ways. They collect items (scrap metal, plastics, bottles) from households, transit points, roadside dumps, and uncontrolled waste sites. Most comb through dumpsites seeking items of value. According to estimates by AFD [26], between 15 million and 20 million informal waste pickers operate across developing nations.

Households represent the primary waste generators and play a decisive role in the waste management chain. Their daily habits and waste disposal behaviors

directly influence their living environment. Widespread practices such as open street burning or direct dumping into the environment emphasize the need for extensive public awareness and education on sustainable practices. Although major waste generators, most households still perceive municipal waste management as the sole responsibility of city hall. This mindset has been noted by several authors across sub-Saharan African cities [20] [27] [28].

Despite this perception, national authorities launched the "Kwa ti Kodro[1]" initiative in September 2022—a civic and community campaign engaging citizens in sanitation, waste management, and environmental protection across Bangui, secondary cities, and local jurisdictions nationwide. A government committee housed within the ministry responsible for local authorities supervises activities including waste removal, clearing blocked gutters, waste disposal, and environmental protection every Saturday from 6:00 AM to 10:00 AM.

3.2. Laws and Regulations Governing Waste Management

3.2.1. Law No. 23.199 of August 30, 2023, Promulgating the Constitution of the Central African Republic

The preamble of the CAR Constitution recognizes the importance of protecting and improving the environment. It implicitly establishes that international environmental treaties, protocols, and conventions ratified by the National Assembly apply as national law. State objectives include improving and protecting air, land, water, forest, and wildlife resources. It further guarantees fundamental rights to life and human dignity, which are intrinsically linked to the right to a healthy, safe environment.

3.2.2. Law No. 07.018 of December 28, 2007, Establishing the Environmental Code of the Central African Republic

Promulgated on December 28, 2007, Article 44 specifies that "waste must be treated to eliminate or reduce harmful effects on human health, natural resources, biological diversity, and environmental quality." Article 45 establishes waste management responsibilities, stipulating that "any natural or legal person who produces or holds waste must ensure its disposal or recycling, or have it disposed of or recycled in facilities approved by the competent authority." The article notes that conditions governing collection, sorting, storage, transport, recovery, recycling, or final disposal are to be set by regulation. In the absence of private capability, individuals or corporate entities must transfer waste to local authorities or state-approved enterprises.

Articles 46 through 50 and 52 through 61 outline waste treatment and recycling requirements, prohibiting illegal dumping, immersion, incineration, or disposal in inland, marine, or fluvio-maritime waters under CAR jurisdiction. The code grants local authorities environmental monitoring rights over their territories,

[1]Kwa ti Kodro (which means "country work" or "community work" in the local Sango language) is a major civic sanitation and public health initiative in the Central African Republic. Officially launched by President Faustin-Archange Touadéra, this presidential initiative aims to combat chronic unsanitary conditions in Bangui, Bimbo, and other provinces throughout the country.

designating communes as project owners for household waste management. However, no implementing decrees have been issued to date to regulate and organize waste management according to the code's requirements.

3.2.3. Law No. 03.04 of January 20, 2003, Establishing the Public Health and Housing Code in CAR

Promulgated on January 20, 2004, this code was complemented by implementing decree Law No. 05.014 of January 14, 2005, detailing regulations for waste collection, evacuation, and treatment. Provisions address environmental health (water, soil, and air pollution), solid and liquid waste management, housing hygiene, water quality, and noise control. It establishes a health police force to investigate infractions and targets both collective and individual sanitation. Article 11 mandates that "any occupant of a house facing a public street must maintain the cleanliness of its immediate surroundings." Article 12 requires that "eateries, kiosks, and inns comply with established hygiene standards." Article 15 prohibits waste dumping inside or outside residential premises, with details set by interministerial decrees.

To enforce compliance, Article 7 specifies: "In urban centers, household waste must be contained in sealed, easy-to-handle metal or plastic containers. It shall then be collected by competent services for transport to a public landfill. In semi-urban or rural areas, waste must be incinerated or placed in a pit for final sanitary burial."

3.2.4. Law No. 20.017 of June 16, 2020, Prohibiting the Production, Importation, Commercialization, Distribution, and Possession of Non-Biodegradable Plastic Packaging and Bags in CAR

This law specifically addresses plastic waste, which constitutes a major share of household solid waste. It addresses restrictions, producer/vendor responsibilities, waste prevention, selective sorting, and recycling. Article 4 states that "the production, importation, commercialization, distribution, and possession of non-biodegradable plastic packaging and bags are prohibited." Despite its relevance, the law remains unenforceable due to a lack of implementing decrees.

3.2.5. Law No. 21.001 of January 21, 2021 (Administrative Subdivisions) and Law No. 20.008 (Organization and Operation of Local Authorities)

Law No. 20.008 represented a major step toward decentralization by clarifying the competencies and responsibilities of local authorities and administrative subdivisions, creating a structured, decentralized administrative framework for local governance. It was complemented by Law No. 21.001 of January 21, 2021, defining administrative jurisdictions. Both laws delegate urban environmental management powers to local authorities.

3.2.6. Law No. 09.003 of January 16, 2009, Establishing Land Use Planning Policy Guidelines

In Chapter 1, Section 2, Article 3, this law defines Land Use Planning as a "policy that, through the balanced distribution of population and various activities across

the national territory, establishes and ensures equal opportunity and living standards among people and regions, defining the territorial collectivity as a delimited and inhabited geographic space in which population representatives have the opportunity to express views on local matters and take charge of resolving local problems." Articles 4, 5, 6, 8, and 9 stipulate that land use planning is implemented by the State in consultation with decentralized territorial collectivities, civil society, and the private sector, in accordance with decentralization laws, operating at both national and regional levels. Article 10 specifies that the "State shall define a viable urban policy adapted to the national and international environment." It outlines, among other things, the functions assigned to urban agglomerations and their hierarchy, service grids, and structural equipment standards.

3.3. Analysis of Legal, Regulatory, and Institutional Gaps in Waste Management in Bangui

Despite the diversity of stakeholders, efforts, and regulatory measures established by the Central African State, the issue of household waste management remains acute across all major cities in the country, particularly in Bangui. Specifically, it suffers from a lack of national laws specific to municipal solid waste management. The absence of specific laws raises potential challenges regarding the efficiency of waste management [3].

Unlike frameworks in certain other African countries, legal and regulatory arrangements regarding waste in the Central African Republic rely primarily on public hygiene, ecological concerns, and individual health. For example, Ouedraogo and Yanogo [28] reported in research conducted in the city of Koudougou, Burkina Faso, the existence of waste-specific laws, demonstrating an institutional commitment to addressing waste comprehensively. Other studies conducted by Benaissa [29] in Algeria and Ngambi [3] in Cameroon noted attractive legal and institutional frameworks for waste management, inspired by an international context in accordance with Agenda 21 and translated into national strategies. These strategies have defined short-, medium-, and long-term options for protecting the living environment and promoting sustainable development. Their responsibilities include regularly evaluating the implementation of regulatory mechanisms, establishing organizations, deciding on appropriate measures, and monitoring the evolution of environmental policies through the implementation of national, community, and local programs and projects [3] [29].

Despite the lack of specific laws or legal and institutional arrangements for municipal solid waste management, the Central African Republic possesses certain laws, such as the Environmental Code, which addresses waste management in Section 1 of Chapter 2 [30].

However, despite the coherent provisions of this law regarding waste management, there is a lack of implementing decrees that would operationalize the code's provisions. This absence of implementing decrees does not favor rational waste management, as certain mandatory transitional provisions, infraction prescriptions, and criminal sanctions cannot be enforced. The Hygiene Code outlines

public hygiene rules in Chapter 1 of its first title. Nevertheless, an inconsistency in the applicability of specific transitional provisions exists despite the existence of this code's implementing decree. Specifically, certain provisions of the implementing decree contradict the code itself.

However, the existence of a law does not guarantee efficiency in household solid waste management. Indeed, in studies conducted in Dakar (Senegal), Rouyat *et al.* [21] showed that despite possessing a dense legislative framework, waste management faced severe operational difficulties. A striking illustration is the specific case of the plastic bag law. Although this law prohibits the importation of plastics, their use persists increasingly, driving the proliferation of this type of waste in Bangui's environment.

Beyond legal and regulatory gaps, household solid waste management in Bangui is marked by deep structural problems across various levels: institutional, technical, financial, social, and organizational.

From a structural and institutional standpoint, the plurality of waste actors in Bangui is a primary cause of poor coordination, which generates competency conflicts, task confusion, and underperformance. Indeed, the fragmentation of responsibilities among a multitude of actors—including local governments, state agencies, private service providers, NGOs, technical and financial partners, and citizens—whose operational, financial, and territorial approaches often conflict, leads to confusion over roles, overlapping activities, and a lack of clarity regarding the responsibilities and funding for certain activities. This situation mirrors findings reported by Bangoura [31] in Conakry, where competency conflicts resulting from task confusion arose due to overlapping responsibilities in coordinating various actors. This was linked to the pursuit of conflicting interests and rationales by different stakeholders [31]. Regarding relationships among associations involved in waste management, interviews revealed a deficit in collaboration and synergy among them. Certain associations engage in practices that generate conflicts within the formal sector by failing to respect pre-assigned pre-collection zone boundaries. This situation is similar to that reported by Sory [32] in research conducted in Ouagadougou, Burkina Faso.

In addition to coordination conflicts, waste management in Bangui suffers from difficult access to certain urban neighborhoods caused by unplanned and anarchic construction. This observation aligns with results reported by Biubwa Ally *et al.* [33], Gowda *et al.* [34], and Kumar and Pandit [35], who emphasized that the uncontrolled proliferation of housing and the absence of paved roads in most studied community areas constitute the primary obstacles to waste collection processes. Consequently, Bertolini and Brakez [36] highlight the necessity of factoring neighborhood or sector typologies into waste pre-collection and collection strategies.

Collection in the city of Bangui falls under the responsibility of city hall, which—due to insufficient financial and technical resources and a lack of qualified personnel—delegates part of these responsibilities to certain associations and pre-

collection enterprises [18]. Constraints surrounding collection are multiple, characterized by colossal quantities of household waste in Bangui and a complete lack of monitoring and control over collection activities. Furthermore, the proliferation of illegal dumpsites leads to the invasion of both authorized storage spaces (approved landfills) and other areas entirely lacking necessary equipment and containment mechanisms. Facing these persistent difficulties, an informal waste management system develops in parallel, resulting in the coexistence of formal and informal systems. However, sustainable urban waste management requires efficient organization, sufficient financial resources, competent human resources, and appropriate equipment and infrastructure [27]. The Kolongo and Ndrès landfills illustrate these failures. Indeed, the Ndrès landfill is essentially an informal dumping site authorized by the commune. Consequently, there is a complete absence of ecological and regulatory standards to govern operations [37], creating health, safety, and ecological risks similar to those reported by Florin and Garret [38] in their study of the Mediouna landfill in Casablanca, Morocco. They recalled that these hazards are magnified by the attainment of saturation thresholds, ground subsidence, and landslides, alongside explosion and fire risks driven by methane, carbon dioxide, and highly toxic and flammable hydrogen sulfide gas pockets [38]. Additionally, studies by Ahoussi *et al.* [39] and Thonart *et al.* [40] reported that illegal dumpsites provide favorable environments for the proliferation of disease-causing germs and infections, as well as flies, mosquitoes, and rodents capable of carrying typhus, leptospirosis, salmonellosis, trichinosis, histoplasmosis, and tularemia.

Financing plays a crucial role in decentralization by enabling local authorities to successfully carry out assigned tasks [18] [41] [42], such as waste management. Unfortunately, the municipality of Bangui struggles to allocate the financial resources necessary to establish effective waste management systems [18] [43]. During interviews, this was confirmed by the head of the municipality's hygiene and sanitation service, who emphasized that the commune's budget allocation for waste management is negligible given the scale of the tasks. This situation has been documented in certain sub-Saharan African countries by Ngnikam and Tanawa [44] in Cameroon and Dansero *et al.* [45] in Benin, who noted that following the transfer of competencies from the central state to local authorities under decentralization, the allocated financial resources failed to match the growing demands of solid waste management.

Finally, insufficient environmental awareness and communication, combined with poor civic behavior among populations, the recurrence of illegal dumping, and the saturation of formal disposal sites in Bangui, contribute—according to Citeretse [46]—to worsening urban unsanitary conditions. In Bangui, the behavior of certain households and pre-collection operators makes solid waste management extremely difficult, as household storage methods, collection, and transport to transit depots remain major challenges. Indeed, several authors report that combined factors of incivility, poverty, inadequate technical and material means,

and exponential natural growth are obstacles to proper solid waste management [28] [46]-[50]. The root causes include training and awareness deficits, weak collection, treatment, recovery, and disposal mechanisms, and above all, widespread civic non-compliance. Other work conducted by Gohourou and Yao-Kouassi [51] in Abidjan, Côte d'Ivoire, established that civic incivility severely hampers waste management. Furthermore, Kapepula *et al.* [52] confirm that the lack of solid waste recovery and recycling operations in developing countries constitutes a major obstacle to sound waste management.

4. Conclusions

Municipal solid waste management as practiced in the city of Bangui, Central African Republic, constitutes a major challenge for environmental protection and public health. Analysis of the legal framework shows that national legislation and regulations appear incomplete regarding the rational management of household solid waste. This waste management system also suffers from a lack of adequate institutional and legal reforms, alongside financial constraints that limit local authorities' ability to support the activity. The failure of the household solid waste management system—particularly concerning municipal solid waste pre-collection—reveals a troubling situation marked by a severe lack of infrastructure, human resources, and logistical means. Weaknesses in environmental education and awareness-raising programs are also evident.

To overcome these failures, it is essential to pursue efforts aimed at improving solid waste management by fostering greater synergy and coordination among stakeholders and by educating the population on the importance of sustainable, responsible waste practices. Such measures can contribute to upgrading the management system while mitigating health and environmental risks for the city of Bangui.

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Author Contributions

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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