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Household Waste Management and Environmental Sustainability in Urban Algeria: A Strategic and Policy-Oriented Analysis

Nadhira ATTALAH [1*], Saida MEFTAH[2]
[1]*Laboratory of History, Civilization, and Applied Geography Higher School of Teachers, Bouzaréah, Algeria.* Attalah.nadhira@ensb.dz
[2]*Laboratory of History, Civilization, and Applied Geography Higher School of Teachers, Bouzaréah, Algeria.* saida.meftah@ensb.dz
**Corresponding author: nadhiraattalah@yahoo.com*

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Abstract

The research examines household waste management practices together with their environmental sustainability effects in Algerian urban regions specifically focusing on Algiers, Oran and Constantine. The rapid growth of urban areas together with increasing population numbers exceeds the current waste management capabilities which results in environmental deterioration and health threats to the public. The research evaluates urban waste management through qualitative document-based analysis to examine legislative structures and institutional frameworks and financial systems and stakeholder participation. The research shows that Algeria has implemented national and international sustainability goals yet it still faces major implementation gaps together with inadequate infrastructure and insufficient public awareness. The existing policies and legal frameworks do not receive proper enforcement while recycling and composting valorization practices remain underdeveloped. The paper supports a strategic transition toward a circular economy model which should combine community involvement with youth business development and environmentally friendly investment. The paper presents practical solutions to enhance sustainable waste management in Algerian urban areas.

Keywords: Household waste; Environmental sustainability; Urban Algeria; Circular economy; Waste management policy

1. INTRODUCTION

The problem of household waste continues to grow in Algerian urban areas because of fast urban development and population growth in cities like Algiers, Oran and Constantine. The rapid growth of solid waste production creates severe environmental and health risks because the current waste collection methods are inefficient and there are no organized sorting systems and insufficient treatment facilities (Cheniti et al., 2013; Drouiche, 2025; Hachemi et al., n.d.). The majority of urban waste ends up in open sites or landfills without treatment which results in water contamination and air pollution and disease vector spread (Hettiaratchi et al., 2010; GIZ, 2025). The situation reveals a fundamental weakness in Algeria's municipal solid waste management capabilities which requires immediate implementation of sustainable solutions.

The situation becomes worse because of fragmented institutions and weak policy execution. The real-world effectiveness of environmental protection and waste management laws enacted by Algeria since the 1980s remains limited because of overlapping jurisdictions and insufficient enforcement (Kehila, 2014; Mkhenfar, 2014/2015; Sayeh, 2014). The National Waste Agency was established but waste management remains either uncontrolled or substandard while municipalities show wide variations in their performance (Cheniti et al.,

2024; Zibouche & Bouarab, 2024). The policy-practice gap creates a major obstacle to establishing a sustainable urban environment.

The importance of this issue extends beyond environmental effects because it affects both economic systems and social structures. Strategic waste management creates economic value through recycling and composting and energy recovery processes (Akrour et al., 2021; Hassaine & Abrika, 2024; Boudjemaa & Boukherroub, 2024). The transformation of waste into marketable resources including biogas and secondary raw materials supports the green economy and generates employment opportunities that benefit youth and local business owners (Brahimi & Kherbache, 2022; Leasiwal et al., 2024). Waste collection and sorting initiatives that include local communities and associations help people develop better environmental awareness while changing their behaviors (Tuanaya, 2024; RegASK, 2025).

The research investigates three main questions about household waste management in Algerian urban areas. What legal and institutional frameworks govern these practices? The study investigates the potential opportunities for waste transformation into economic value while maintaining environmental sustainability. The research uses a qualitative document-based analytical method to examine Algerian legislation together with government reports and scientific articles and institutional strategies (Veckalne & Tambovceva, n.d.; Lamri, 2022; Shi et al., 2021). The research method enables a thorough assessment of waste management practices in Algeria through their structural analysis and challenge identification and opportunity exploration.

The following structure will be used in the remainder of this paper: The first section reviews the theoretical and conceptual foundations of waste and its categorization. The second section examines the major determinants of urban waste in Algeria. The third section explores institutional and legislative mechanisms and their effectiveness. The fourth section presents strategic frameworks, financial instruments, and civil society engagement. Finally, the conclusion summarizes findings and outlines actionable recommendations for future policies and practices.

2. LITERATURE REVIEW

Household waste consists of solid waste produced through everyday domestic human activities which include food waste and packaging materials as well as paper and plastic products. The waste requires unique approaches to separate it from other waste types and to handle its disposal and treatment process (Cheniti et al., 2013; Shi et al., 2021). Waste management functions as a comprehensive system which includes waste collection and transportation and processing and recycling and disposal operations to minimize environmental and health impacts (Hettiaratchi et al., 2010; Bhange et al., 2017). Environmental sustainability involves practices which protect ecosystems through reduced resource consumption and pollution while achieving maximum economic and social benefits (Veckalne & Tambovceva, n.d.; Kothai et al., 2024).

The practice of urban waste management has transformed from simple disposal methods into comprehensive systems which combine source separation with waste-to-energy technologies and circular economy approaches. Developed countries have adopted zero-waste policies through innovative approaches and strict regulations to decrease their reliance on landfills (Shi et al., 2021; Hettiaratchi et al., 2010). The Global South regions encounter fundamental barriers which prevent them from adopting sustainable waste management systems. The Maghreb region can learn from community-led waste recycling programs in Southeast Asia which demonstrate successful models for implementation (Kurniawati et al., 2024; Leasiwal et al., 2024).

The Algerian government established a complete legal framework for sustainable waste management through Law No. 03-10 (2003) and Executive Decree No. 07-205 (2007) which require municipal waste management plans (Mkhenfar, 2014/2015; Sayeh, 2014). The National Waste Agency (AND) together with the Ministry of the Environment serve as essential institutions for implementing and supervising waste management

(Kehila, 2014; GIZ, 2025). The formal existence of these laws and structures does not guarantee consistent enforcement because weak inter-institutional coordination persists (RegASK, 2025; Hachemi et al., n.d.). The operational effectiveness of municipal waste strategies faces delays because of these gaps which prevent the transition to integrated sustainable models.

The development of efficient household waste management systems faces particular challenges in developing nations such as Algeria. The main obstacles to efficient waste management include insufficient infrastructure combined with restricted financial capabilities and scarce data access and minimal public environmental understanding (Brahimi & Kherbache, 2022; Cheniti et al., 2024). The lack of proper waste segregation at the source in urban areas makes it difficult to implement recycling and reuse programs. The informal waste pickers work without protection or recognition although they are essential for recovering recyclable materials (Tuanaya, 2024; Drouiche, 2025). The absence of educational initiatives together with minimal public participation hinders the establishment of sustainable waste practices within urban communities.

Multiple recent research studies have studied waste generation and management in Algerian cities including Algiers, Tipaza and M'sila to provide essential information about waste composition and policy implementation and public attitudes (Akrour et al., 2021; Lamri, 2022; Zibouche et al., 2023). The national literature requires more integrative assessments to connect legal frameworks with environmental sustainability goals and economic valorization strategies despite the valuable case-based data from these studies. The current empirical research remains fragmented because it focuses on technical analysis without including sociopolitical context or foresight dimensions (Hassaine & Abrika, 2024; Boudjemaa & Boukherroub, 2024). The current situation requires interdisciplinary approaches that unite legal and technical aspects with environmental and social elements.

3. CONCEPTUAL AND THEORETICAL FRAMEWORK

3.1. Definitions and Classification of Waste

Language: Waste is singular, "waste" which is derive from "negation," which is the rest of it or its waste.

It means garbage, filth, or waste, it is the gift of somethings the owner no longer wants at a certain place or time, and that have become of no importance or value, as defined by the World Health Organization It is synonymous with wastes in English, and in French**.**

The World Health Organization (WHO) defined waste as some of the things that its owner did not want somewhere and when it became irrelevant or worthless, as World Bank experts knew was something that currently had no direct benefit, and should temporarily ostracized. "According to the Council of the European Economic Union in defining wastes, article 1 of Directive No. 78/319 of 20/03/1978 establishes the intention of its owner to abandon them (According to Ibn Manẓūr (1998), the term conveys deeper historical and linguistic connotations)

Economic definition: Everything has a bad or negative economic value for its owner. Legal definition: In accordance with article 03 of Act No. 01-19 of 12 December 2001 of the Official Gazette, it defined as all residue resulting from production, transfer or use, and more generally every substance or crowning and any transferee disposed of by the owner or holder or intended to dispose of and remove it.

Waste is all that human activities or vital processes have to do with its value.

These substances vary in their nature and undergo degradation quickly. Substances degraded in an intermediate period, substances degraded in a longer period (we can say they are non-degradable), and their composition varies from region to region depending on several factors. In the case of Algerian wastes, The

Table.1 organizes household waste into categories that include waste type and origin as well as recyclability and environmental risk. The table establishes fundamental knowledge about waste composition in Algerian urban areas which serves as a basis for developing suitable waste treatment and recycling approaches. The classification system connects waste types to their environmental effects which will guide future discussions about valorization and management decisions

Table 1: Classification of Household Waste by Source and Composition

Waste Type	**Examples**	**Origin**	**Recyclability**	**Environmental Risk**
Organic Waste	Food scraps, garden waste	Domestic kitchens	High	Medium
Plastic	Bottles, bags, containers	Packaging	Medium	High
Paper & Cardboard	Newspapers, packaging	Offices, households	High	Low
Metals	Cans, wires	Households, shops	High	Medium
Glass	Bottles, jars	Restaurants, homes	High	Low
Hazardous Waste	Batteries, cleaning agents	All urban settings	Low	Very High

Source: *Prepared by the authors based on Cheniti et al. (2013); Brahimi & Kherbache (2022); Hachemi et al. (n.d.).*

3.2. Key Indicators in Waste Management

The quantitative indicators for evaluating household waste management systems appear in **Table.2** with their application to the Algerian situation. The operational and environmental efficiency of municipal waste services become clear through waste generation rate and collection coverage and recycling and composting rates and landfilling prevalence indicators. The recycling rate remains below 5% while landfilling exceeds 80% which demonstrates the immediate requirement for circular economy practice implementation. The indicators showing investment levels and public awareness demonstrate systemic weaknesses that block the sustainability of current waste strategies. The consistent measurement of these indicators enables policymakers to track progress while identifying gaps which helps them direct investments toward building more resilient and inclusive waste management models for urban Algeria.

Table 2: Classification of Household Waste by Source and Composition

Indicator	**Definition**	**Typical Value (Algeria)**
Waste Generation Rate	Average waste produced per capita per day (kg/person/day)	0.80–0.90
Collection Coverage	Percentage of population with access to waste collection services	65–80%
Recycling Rate	Percentage of total waste recycled annually	<5%
Composting Rate	Percentage of organic waste composted annually	<2%

Landfilling Rate	Percentage of waste disposed in landfills	>80%
Public Awareness Index	Level of public participation and knowledge on waste issues	Low to Medium
Investment in Waste Infrastructure	Annual financial investment in waste-related infrastructure	Low
Number of Waste Management Facilities	Total facilities for sorting, recycling, or treatment	Few centralized units
Formal Employment in Waste Sector	Jobs created under formal regulations and contracts	Moderate
Informal Sector Participation	Contribution of informal collectors, recyclers, and sorters	High but unregulated

Source: *Prepared by the authors based on Cheniti et al. (2013); Brahimi & Kherbache (2022); GIZ (2025); Kehila (2014).*

Other factors contribute to the quantification of wastes at stake. The waste quantity is one of the most important indicators for measuring the State's achievement of environmental governance, and the method of calculating the number of wastes at stake. always due to the waste production which represents the relationship between waste production in general (kg/year) and statistical data associated with such production that may be population, area or number of occupancy positions (kg/ha). (Kg/ year). (Kg/ position) However, per capita production of wastes is express in the following equivalent:

The essential indicators and contextual variables for urban household waste measurement and management appear in **Table 3** The technical indicators which include per capita waste generation density moisture content and thermal capacity serve as essential elements for designing effective infrastructure systems such as optimized collection systems and treatment technologies. The combination of high moisture content and low thermal capacity in Algerian household waste makes composting more suitable than incineration. The carbon-to-nitrogen ratio functions as a biochemical indicator which helps determine if aerobic treatment methods like fermentation are suitable.

Table 3: Technical and Measurement Indicators

Indicator	Definition / Formula	Purpose / Relevance
Per Capita Waste Production	Total waste (kg/year) ÷ Total population	Measures average individual contribution to total waste, key for urban planning
Waste Density	Mass of waste (kg) ÷ Volume occupied (m^3)	Determines container design, vehicle load capacity, and landfill optimization
Waste Moisture Content	Proportion of water in solid waste (%), avg. ~80% in organic household waste	Affects treatment method choice (e.g., composting vs. incineration)
Thermal Capacity of Waste	Heat released by burning 1 kg of waste (kcal/kg)	Important for assessing viability of incineration; decreases with higher moisture content

Carbon-to-Nitrogen Ratio (C/N)	Ratio before treatment: 20–35; after fermentation: 15–18	Determines composting suitability and organic stability

Source: *Prepared by the authors based on synthesis of field concepts and technical parameters discussed in environmental waste management literature (Cheniti et al., 2013; Kehila, 2014; Hassaine & Abrika, 2024; Brahimi & Kherbache, 2022).*

The **Table 4** demonstrates how waste generation patterns are influenced by socio-economic factors and environmental conditions.

Table 4: Contextual Factors Influencing Waste Generation

Factor	Explanation
Standard of Living & Consumption	Higher income levels increase consumption and therefore waste quantity
Tariff & Legal Enforcement	Stronger enforcement of environmental laws correlates with better waste control
Collection System	Depends on road quality, transport means, and proximity to disposal sites
Urbanization Rate	Rising urban migration concentrates waste generation in cities
Recycling Infrastructure	Limited capacity in developing countries leads to over-reliance on open dumps
Economic & Industrial Profile	Weak industry and extraction-oriented economies result in high waste and low resource recovery
Seasonal Climate Variation	Waste quantity increases in warmer seasons due to higher organic (e.g., food) waste

Source: *Prepared by the authors based on synthesis of field concepts and technical parameters discussed in environmental waste management literature (Cheniti et al., 2013; Kehila, 2014; Hassaine & Abrika, 2024; Brahimi & Kherbache, 2022).*

The combination of urban growth with inadequate recycling facilities and changing seasonal weather patterns creates excessive strain on municipal waste management systems. The amount of waste produced together with its management efficiency depends directly on economic conditions and legal enforcement levels. These indicators create an essential analytical framework which supports both policy development and strategic waste management planning for Algerian cities.

4. DETERMINANTS OF WASTE GENERATION IN ALGERIA

The composition of household waste is a crucial element in designing efficient and sustainable waste management systems. More than half of the total household solid waste in urban Algerian settings is organic waste as shown in **Figure 1.** This composition pattern highlights the need for investments in composting infrastructure and organic waste recovery. The large number of plastics and textiles in the waste stream indicates that recycling facilities need improvement and that packaging waste should be reduced at the source.

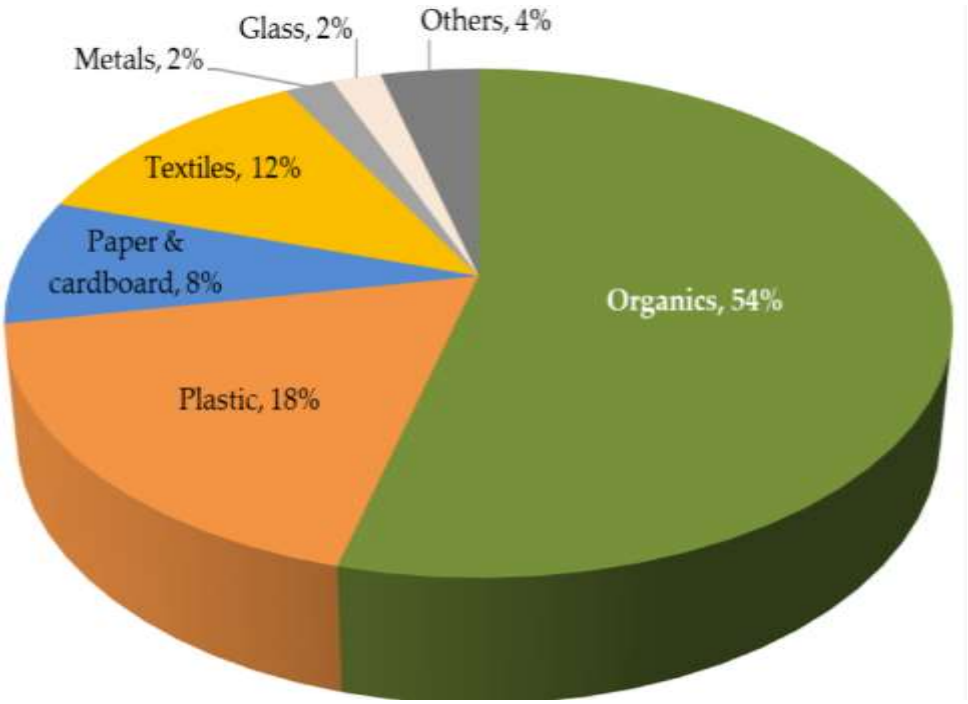

Figure 1. Composition of Household Solid Waste in Urban Areas

Source: *Adapted from field data and typical composition profiles in Algerian municipalities (Cheniti et al., 2013; Brahimi & Kherbache, 2022).*

The identification of waste generation determinants enables the creation of specific solid waste management strategies for Algerian urban areas. The determinants of waste generation operate through different socio-economic and institutional and technical and demographic and environmental factors which create distinct pressures on waste volume and composition.

The standard of living together with consumption patterns serve as primary **socio-economic factors.** People with higher incomes tend to buy more packaged products which generates more plastic waste and textile waste and paper waste. The data in **Table 5** demonstrates that urban municipalities with higher economic activity produce more waste per person.

Table 5: Socio-Economic Influence on Waste Generation

Income Level	Waste per Capita (kg/day)	Common Waste Types
High-income zones	0.95 – 1.10	Plastics, packaged foods, e-waste
Middle-income zones	0.75 – 0.90	Organics, paper, packaging
Low-income zones	0.60 – 0.75	Organics, limited packaging

Source: *Prepared by the authors based on Cheniti et al. (2013); Brahimi & Kherbache (2022).*

5. INSTITUTIONS AND LEGISLATION RESPONSIBLE FOR SOLID WASTE IN ALGERIA

5.1. Key Legislative Tools and Planning Mechanisms

The legislative and regulatory frameworks also have a defining influence. The lack of effective enforcement of environmental laws and insufficient institutional oversight leads to uncontrolled dumping and low recycling rates. The results remain suboptimal despite the presence of Law No. 03-10 and decrees that created the National Waste Agency because of limited field implementation. These gaps are detailed in **Table 6** and further reflected in **Table 8:** Major Challenges of Urban Household Waste Management in Algeria

Table 6: Chronology of Algerian Laws and Decrees Related to Waste Management

Year	Law / Decree No.	Title / Purpose	Institution Involved
1983	Law No. 83-03	Protection of the environment	Ministry of Environment
2003	Law No. 03-10	Sustainable environmental protection	Government of Algeria
2002	Executive Decree 02-175	Establishment of the National Waste Agency (AND)	Ministry of Environment
2007	Executive Decree 07-205	Municipal Waste Management Plan Guidelines	Local Municipalities

Source: *Prepared by the authors based on Mkhenfar (2014/2015); Sayeh (2014); Kehila (2014).*

The **table.7** presents an organized analysis of environmental institutional growth and policy development during three distinct historical periods. The table demonstrates how environmental governance evolved from separate sectoral rules during the post-independence period to unified structured systems during the 2000s. The second phase introduced institutional experimentation together with decentralization initiatives. The third phase demonstrates the government's attempt to consolidate environmental responsibilities under a single ministry. The progress made in environmental governance has not eliminated ongoing problems which include poor institutional coordination and high administrative expenses and delayed planning tool implementation. The table demonstrates that Algeria requires a unified governance framework to achieve successful solid waste management and environmental protection.

Table.7: Evolution of Environmental Governance in Algeria

Period	Key Features	Institutional Developments	Limitations
First Stage (1962–1974)	Sectoral legislative texts; lack of national coordination; limited regulatory scope; early licensing for waste collection.	No dedicated environmental body; fragmented oversight.	Inconsistent and ad hoc regulations; absence of comprehensive policy.
Second Stage (1974–2001)	Creation of the National Committee for the Environment (1974); involvement of various ministries; decentralization of waste management; regional/local group	Ministries of Irrigation, Education, Universities, Interior, Urbanization involved; establishment of regional/local groups.	Lack of coordination; varied mandates; limited enforcement power.

	integration; legal frameworks for municipal/state roles (1990); territorial planning law (1996).		
Third Stage (2001–2024)	Establishment of Ministry of Environment (2001); new governance via Executive Decrees 01-08 & 01-09; coordination across ministries; national planning law 20-01; PDAU, POS, and National Council for Territorial Planning and Sustainable Development.	Ministry of Environment with centralized directorates; National Council for Territorial Planning and SD; mandated predictive studies by accredited bodies.	Unclear legal mechanisms for inter-ministerial coordination; high costs; delays in planning tools implementation.

Source: *Prepared by the authors based on Kehila (2014); Lamri (2022); Hassaine & Abrika (2024); GIZ (2025).*

6. NATIONAL STRATEGY FOR SUSTAINABLE WASTE MANAGEMENT

The table presents the primary obstacles to efficient waste management in Algerian cities through institutional and infrastructural and economic and behavioral categories. The analysis connects these challenges to existing research which supports an evaluation of present policy weaknesses.

Table 8: Major Challenges of Urban Household Waste Management in Algeria

Category	**Specific Challenge**	**Reference(s)**
Infrastructure	Lack of sorting facilities	Cheniti et al. (2024); Brahimi & Kherbache (2022)
Legislation	Weak enforcement of existing laws	Mkhenfar (2014/2015); Sayeh (2014)
Public Awareness	Low civic engagement in waste separation	Tuanaya (2024); Drouiche (2025)
Institutional	Poor coordination between agencies	Kehila (2014); Hachemi et al. (n.d.)
Economic	Limited investment in recycling technologies	Hassaine & Abrika (2024); GIZ (2025)

Source: *Prepared by the authors based on cited studies.*

7. METHODOLOGY

The research uses qualitative methods through document-based analysis to study household waste management and environmental sustainability in urban Algeria. The research focuses on three major urban areas of Algeria which are **Capital of Algeria, Oran and Constantine.** The selected study areas are three major urban centers of the country which have different population densities, economic activities and infrastructure capacities for comparative analysis. (Cheniti et al., 2013; Akrour et al., 2021).

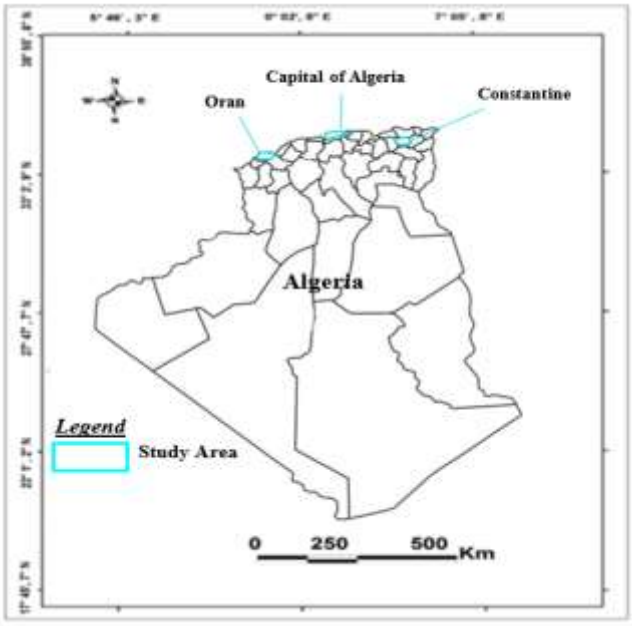

***Figure 02**. Geographical Map of Algeria Highlighting Study Area*

The research data collection relied on secondary sources which included peer-reviewed articles together with government legislation and institutional reports and technical documentation from the National Waste Agency (AND) and the Ministry of the Environment (Kehila, 2014; GIZ, 2025). The research evaluated relevant theses together with previous case studies which studied local waste practices in El-Khroub, Tipaza, M'sila, and Tlemcen (Lamri, 2022; Brahimi & Kherbache, 2022; Boudjemaa & Boukherroub, 2024). The research incorporated an assessment of current legal decrees and public policy frameworks that relate to waste management. (Mkhenfar, 2014/2015; Sayeh, 2014).

The study did not include primary surveys or structured interviews because of its nature but participant observation and comparative document analysis were used as qualitative methods. The study examined publicly available data about municipal waste plans and recycling initiatives and informal actors' roles in waste collection and sorting (Tuanaya, 2024; Drouiche, 2025).

The research used purposeful sampling to select data sources which covered various aspects of household waste management including legal frameworks institutional structures operational practices and socio-environmental factors. The non-probability sampling method selected only relevant recent high-impact documents to achieve depth and context in the analysis (Cheniti et al., 2024; Zibouche & Bouarab, 2024).

The research data underwent qualitative content analysis for evaluation. The documents underwent systematic coding to identify patterns and themes and gaps based on waste types and institutional roles and legal enforcement and sustainability outcomes. The research used cross-case comparison to identify both similarities and differences between urban centers while focusing on policy effectiveness and public participation (Veckalne & Tambovceva, n.d.; Hachemi et al., n.d.).

8. DISCUSSION AND CRITICAL ANALYSIS

8.1. Waste Composition Patterns

The data indicates **Table 9** organic waste constitutes the largest fraction of Algerian household waste since it exceeds 50% of total waste. The data shows that organic waste makes up more than 50% of total waste in all urban municipalities which indicates a significant opportunity for composting programs.

Table 9: Household Waste Composition Breakdown

Waste Component	Average Share (%)
Organic Waste	54%
Plastics	18%
Textiles	12%
Paper and Cardboard	6%
Metals	5%
Glass	3%
Others	2%

Source: *Prepared by the authors based on field estimates and study analysis (2025).*

8.2. Waste Generation by City

The **Table. 10** shows the amount of daily household waste generated in Algiers, Oran, and Constantine, which demonstrates the differences in waste generation between these regions. The data enables the analysis of how population changes and urbanization patterns affect the magnitude and importance of waste management issues.

The waste management strategy of Algeria has undergone significant legislative and institutional changes during the past decades. The established frameworks and bodies have not achieved uniform effectiveness in their policies. The country maintains strong environmental legislation yet its implementation faces multiple obstacles in the field.

Table 10: Estimated Household Waste Generation in Selected Algerian Cities

City	Population (2023 est.)	Waste Generated (tons/day)	Per Capita Generation (kg/day)
Algiers	3.9 million	3,500	0.90
Oran	1.5 million	1,200	0.80
Constantine	1.1 million	950	0.86

Source: *Prepared by the authors based on field estimates and study analysis (2025).*

The main challenge arises from the difference between national policies and local implementation of these policies. Municipalities face financial and technical limitations which prevent them from meeting their assigned responsibilities thus leading to poor collection services and open dumping and restricted recycling activities. The TEOM tax and composting incentives function as regulatory tools but their application remains inconsistent which reduces their effectiveness.

8.3. Stakeholder Engagement and Youth Involvement

The survey results together with program assessment data show that youth-led projects and micro-enterprises remain underdeveloped despite existing support from ANSEJ and CNFE. The opportunities outlined in **Table.11** represent an unexplored potential to activate local innovation and employment

Table 11: Opportunities for Youth and Micro-enterprises in the Waste Sector

Activity	Target Group	Support Mechanisms
Door-to-door collection	Young entrepreneurs	Micro-credit, equipment leasing (ANSEJ)
Organic waste composting	Rural youth groups	Land access, technical training (CNFE)
Plastic and e-waste recycling	Urban youth	Local hubs, start-up funding (ANDI, ANGEM)
Awareness and education services	NGOs and school clubs	Grants for campaigns (Ministry of Environment)

Source: Prepared by the authors based on Hassaine & Abrika (2024); GIZ (2025); RegASK (2025).

International best practices show that successful circular economy implementation requires policy integration between legislative frameworks and educational programs and infrastructure development and private sector participation. The models of Tunisia and Morocco demonstrate better success in building material recovery facilities and community-based composting through specific donor funding and local training initiatives and decentralized governance structures.

The solution requires Algeria to improve institutional coordination while maintaining continuous infrastructure investment and youth and community participation in local solution development. The country needs to establish this framework before it can start realizing environmental and economic benefits from its national circular economy model.

9. NATIONAL STRATEGY FOR SUSTAINABLE ENVIRONMENT

The national strategy for environmental sustainability in Algeria developed through responses to increasing urbanization and environmental deterioration and international climate commitments. The strategy unites environmental protection with economic growth through solutions that tackle pollution origins and resource misuse and poor waste management practices. The national approach bases its framework on **Laws No. 01-19** for sustainable development and **No. 20-01** for territorial planning to achieve balanced regional development and environmental equity.

The strategy includes three main pillars which focus on promoting a circular economy and protecting ecological heritage and using natural resources in a rational manner. The main objectives require environmental planning tools PDAU (Plan Directeur d'Aménagement et d'Urbanisme) and POS (Plan d'Occupation des Sols) to work together by linking land use policies with environmental risk assessments and urban development goals.

The government has created inter-ministerial coordination frameworks and has empowered institutions such as the Ministry of Environment, National Waste Agency (AND), and National Council for Territorial Planning and Sustainable Development to operationalize this strategy. These bodies are responsible for enforcing environmental impact studies, overseeing the implementation of ecological regulations, and mobilizing investment for green infrastructure.

The implementation of the strategy faces ongoing challenges because of bureaucratic overlap and delayed local planning tool deployment and insufficient public participation. The state needs to improve institutional coherence while ensuring equitable budget allocation and utilizing private sector and youth participation to reach its strategic objectives. The state needs to conduct regular monitoring and impact evaluations to ensure actions align with sustainable development indicators.

Table 12: Strategic Pillars of Algeria's National Environmental Policy

Pillar	Objectives
Circular Economy	Waste reduction, resource recovery, green jobs
Territorial Planning and Equity	Balanced regional development, spatial justice
Ecological Heritage Protection	Preserve biodiversity, control urban sprawl
Institutional Coordination	Clear mandates for ministries, local-central alignment
Environmental Risk Management	Integrate EIAs, climate resilience, pollution prevention tools
Sustainable Investment	Promote eco-financing, PPPs, and clean technology adoption

Source: *Prepared by the authors based on Law 20-01, Executive Decrees 01-08 and 01-09; Hassaine & Abrika (2024); GIZ (2025); RegASK (2025).*

The funding for Algeria's waste system comes from various sources such as environmental levies, TEOM (waste removal tax), plastic bag levies, and international aid.

Table 13: Financial Sources for Waste Management in Algeria

Source	Description
Environmental levies	75% to FEDEP, 15% to state, 10% to local budgets
TEOM (Taxe Ordure)	Annual household waste removal fee collected by local municipalities
Plastic bag tax	10.5 DZD/kg as per 2004 Finance Law, revenue to National Environment Fund
Public spending	Via public funds including FEDEP, National Development Fund, and Southern Regions Fund
International assistance	Funding from World Bank, Islamic Development Bank, European Investment Bank, GEF

Source: *Prepared by the authors based on GIZ (2025); Finance Law (2004, 2014); Hassaine & Abrika (2024).*

The new economic development model led Algeria to establish a national strategy which targets 14 out of the 17 Sustainable Development Goals (SDGs) that the country endorsed at the United Nations Conference on Sustainable Development (UNCSD). The strategy focuses on three main goals which include developing a green economy and circular waste systems and creating environmental governance institutions and using civil society to promote environmental awareness and management.

The government has strategically engaged social institutions such as the Ministry of Education and the Ministry of Religious Affairs. Educational institutions teach waste management as part of their curriculum and operate environmental clubs that also receive weekly environmental preservation messages from mosques. National associations together with political parties received support to launch local environmental initiatives which include neighborhood cleaning competitions and waste sorting programs.

The media sector in Algeria functions as a key factor for public environmental awareness campaigns. Since 2004 dedicated TV and radio programs have tackled environmental issues. The private sector received national agency support through tax exemptions and youth training schemes and grants to participate in waste management and recycling activities.

10. RECOMMENDATIONS AND SUGGESTIONS

Algeria should apply methods that enable waste management and recycling by adopting modern methods that will reduce costs and contribute to preventing the degradation of the environment and nature.

- Attention to instilling a culture of waste recycling among citizens through the media and sensitizing them to recycle waste instead of disposing of it indiscriminately.
- Incentivize capital to invest in the field of waste management through material and moral support and actual accompaniment to ensure the financing of waste management projects and prioritize them over other projects that are not feasible.
- Encourage the import of clean technology from leading countries in the field of waste management and recycling, exchange experiences and conclude partnership contracts with leading organizations in this field, and pay more attention to small enterprises.

11. CONCLUSION

The research examined household waste management in urban Algeria through the lens of environmental sustainability and green economic transition. The current waste management system in Algeria operates mainly as a linear process because the country has established legislative frameworks and institutional structures and financing mechanisms yet recycling and valorization practices remain limited.

The research demonstrated that local enforcement remains weak while economic and technical incentives remain unused and civil society and youth participation in waste initiatives remains minimal. The analysis revealed positive trends which include environmental education in schools and strategic partnerships with micro-enterprises and fiscal reforms that support composting and selective waste collection.

Sustainable outcomes in Algeria require strengthening circular economy commitments through infrastructure development and better inter-institutional coordination and community empowerment. The national strategy needs to achieve environmental pressure reduction while discovering waste recovery potential to fulfill Sustainable Development Goals (SDGs). The transition from waste disposal to waste valorization represents both a necessary and immediate requirement.

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