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Local Authorities Responsible for the Management of Household Waste

الجماعات المحلية المكلفة بتسيير النفايات المنزلية

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Abstract:
Household waste has become a significant issue attracting the attention of all states, due to the various harms it causes at multiple levels, as well as the value it can generate when properly utilized. In light of the importance of this topic, we have chosen to shed light on the role of local authorities entrusted with waste management, with a view to mitigating its negative impacts on the environment and living organisms.

Keywords:Local authorities, household waste, incineration, recycling.

ملخص:
أصحبت النفايات المنزلية من المواضيع المهمة التي تحظى باهتمام كل الدول، نتيجة الأضرار التي تسببها على مختلف الأصعدة، فضلا عن القيمة التي تضيفها في حالة الاستفادة منها، ونظرا لأهمية الموضوع- ارتأينا تسليط الضوء على الجماعات المحلية التي تتكفل بتسيير هذه النفايات للتقليل من آثارها السلبية على البيئة والكائنات الحية.

كلمات مفتاحية:الجماعات المحلية، النفايات المنزلية، الحرق، الرسكلة.

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I- Introduction:

Household waste and similar waste constitute one of the most pressing environmental problems faced by most countries, including Algeria. This is primarily due to their accumulation in residential areas and at the entrances of cities and villages. Such waste is also found in dams, wells, valleys, lakes, and even along seashores.

The volume of this waste has increased as a result of the economic and social transformations experienced by contemporary societies, including continuous population growth, changing consumption patterns, and expanding urbanization. These developments have generated severe negative impacts on the environment and on all living organisms, particularly human beings.

Accordingly, the need to seek effective solutions for the management of household waste and similar waste has become imperative. Waste management is not limited to its technical dimension; rather, it is closely linked to the legal and regulatory framework that defines the responsibilities of the various stakeholders, foremost among them local authorities. In this context, Algeria—like other states—has sought to establish legal mechanisms for waste management through the enactment of Law No. 01/19, which aims to define this category of waste and regulate its management by local authorities (Law No. 01/19, 2001, art. 3).

In light of the foregoing, the following research question is raised:

- To what extent is the role assigned to local authorities effective in the management of household waste?

To address this issue, the paper is structured around two main sections:

- Section One: The conceptual framework of household waste.
- Section Two: The role of local authorities in the management of household waste.

II – Section One: The conceptual framework of household waste

With the continuous increase in the volume of household and similar waste—resulting in serious environmental and social risks—largely attributable to population growth and rising living standards, this phenomenon has significantly intensified. In light of these developments, this section examines the definition of household waste (First), its characteristics (Second), and its classification (Third).

II.1. Definition of household waste:

This subsection addresses the linguistic definition (1), the terminological definition (2), and the legal definition (3).

II.1.1. Linguistic definition:

According to Lisan al-Arab, “al-nifāyah” (with a ḍamma) refers to that which is discarded from something due to its poor quality. Thus, from a linguistic perspective, the term revolves around the notions of rejection, exclusion, and disposal of an item because of its inferiority or lack of anticipated benefit (Karnash, 2018, p. 208).

II.1.2. Terminological definition:
Waste, in general, is defined as "materials that have no economic value from the perspective of their holder or producer." It has also been defined as "movable and discarded items that their owner seeks to dispose of in a proper and lawful manner in order to protect public health." (Makhnefer, 2015, p. 9).
The Algerian Ministry of Land Use Planning and Environment has defined it as "all waste generated by households, as well as waste resulting from artisanal and commercial activities, which can be collected and treated without resorting to special techniques." (Hafsi & Al-Laithi, 2020, p. 301).
It has also been described as "a set of objects or residues that hold no value for the individual who has discarded them in the course of daily domestic, productive, or agricultural activities." (Bouhassane, 2023, p. 244).

II.1.3. Legal definition:
The Algerian legislator defined waste in Law No. 01/19 (aforementioned) as "all residues resulting from production, transformation, or use processes, and more generally any substance, product, or movable property that the owner or holder disposes of, intends to dispose of, or is required to dispose of or remove." (Law No. 01/19, art. 3[1]).
Article 3(2) of the same law defines household and similar waste as "all waste resulting from domestic activities and representative waste resulting from commercial, industrial, artisanal, and other activities which, by their nature, resembles household waste."

II. 2. Characteristics of household and similar waste:

Household waste is distinguished from other types of waste by several characteristics, notably its capacity for chemical interaction, conversion into compost, and recycling.

II.2.1. Susceptibility to chemical interaction:
When household waste accumulates in streets, roads, and open spaces for a certain period, its components interact with environmental factors—most notably water and oxygen—leading to chemical and physical reactions. These reactions negatively affect the environment and, consequently, human health, in addition to significantly impairing the aesthetic quality of urban spaces (Kacem, 2023, p. 117).

II.2.2. Capacity for conversion into compost:
The ability of household waste to be transformed into compost constitutes a distinguishing feature. This transformation provides numerous economic advantages, particularly in the agricultural sector. Compost serves as a source of organic matter, whose essential components include carbon and nitrogen. Such conversion accelerates plant growth and enhances agricultural productivity by improving soil quality from a physical standpoint, partly through the elimination of disease-causing pathogens. Moreover, it contributes to reducing the volume of household waste by approximately 50% to 70%, which is a principal objective of waste management processes (Hafsi & Al-Laithi, p. 303).

II.2.3. Recyclability:

Recycling represents one of the most important methods of managing household waste and plays a crucial role in reducing its volume. Through recycling, waste materials are transformed into new products with economic and environmental benefits. A common example is the recovery and recycling of paper waste, which is widespread due to the relative simplicity of its processing (Kacem, p. 118).

II. 3. Classification of household and similar waste:

Household waste may be classified according to its source and its physical nature.

II.3.1. Classification by source:
From the perspective of source, waste may be categorized into domestic household waste, commercial waste, and agricultural and industrial waste that is similar in nature to household waste.

a) Waste from human domestic and commercial activities:

This category refers to the residues generated by households, restaurants, hotels, street waste, and construction debris from building homes. Household residues include food scraps, glass, plastics, and paper, as well as animal waste produced in domestic settings. Additionally, commercial establishments generate waste such as paper and expired goods (Makhnefer, p. 11).

b) Agricultural and industrial waste similar to household waste:

- Agricultural waste: This includes all waste generated by farms and agricultural activities, such as fertilizers, growth of harmful plants, greenhouse residues (Kebab, 2021, p. 282), animal excretions, and leftover feed and plant material, especially after harvest seasons and fruit collection from farms (Kacem, p. 119).
- Industrial Waste: Industrial waste varies depending on the level of industrial development. Highly advanced industries may produce minimal waste due to the adoption of modern manufacturing methods, whereas traditional or small-scale industries may generate large quantities of residues due to outdated or primitive production techniques. This poses challenges for manufacturers, particularly regarding the disposal of hazardous materials.Therefore, industrial waste differs in type and quantity according to the nature of the industry and its production methods (Hafsi & Al-Laithi, p. 302).

II.3.2. Household waste according to its physical nature:
Household waste can be classified into organic and inorganic waste, as well as biodegradable and non-biodegradable waste.

a) Organic and inorganic household waste:

This classification is based on the physical composition of the waste. Organic waste consists of fermentable materials, such as food scraps, plant residues, and animal excreta. In contrast, inorganic household waste includes non-decomposable materials such as plastics, metals, and other substances. Inorganic waste poses significant risks to human health and the environment due to its resistance to natural decomposition (El-Nimr, 2009, p. 31).

b) Biodegradable and non-biodegradable household waste:

Biodegradable household waste contains organic materials that decompose rapidly, especially during periods of high temperature. This decomposition facilitates the proliferation of insects, bacteria, and rodents, which negatively impacts public health and the environment. Examples of such waste include food scraps, animal excreta, dead animals, and spoiled fruits… (Makhnefer, p. 12).
Non-biodegradable household waste, also referred to as "civilized waste," includes all materials that are unusable or unwanted, resulting from consumption, production, or disposal processes. After treatment, these materials may be redirected to secondary uses and include items such as glass, aluminum, plastics, and recycled materials… (Abdelli, 2016, p. 5).

III- Section Two:The role of local authorities in the management of household waste

The intervention of public authorities has become essential for the protection of public order, particularly in matters relating to environmental protection. Among these authorities are the local administrative bodies, namely the wilaya (province) (first) and the municipality (commune) (second), which are vested with powers and competencies in the field of environmental protection, especially with regard to the management of household waste and similar waste.

III.1. The role of local authorities in household waste management at the wilaya level:

The wilaya consists of two main bodies (Law No. 12/07, 2012, art. 1): the People's Provincial Assembly and the governor, each with specific responsibilities in household waste management, alongside the role of environmental directorates at the wilaya level.

III.1.1. People's Provincial Assembly:
The role of the People's Provincial Assembly in household waste management is evident through its powers to maintain environmental protection and take measures aimed at cleaning, purifying, and maintaining watercourses within its jurisdiction. It also contributes to all preventive and epidemic control measures in the fields of animal and plant health (Law No. 12/07, arts. 77, 84, 86, 87).

III.1.2. Governor:
The governor acts as the state representative at the wilaya level. He holds administrative authority enabling him to maintain public order, security, safety, and residential welfare (Law No. 12-/07, art. 114). In addition, he intervenes in household waste management. The legislator assigns him the task of issuing licenses for operating household and similar waste treatment facilities (Law No. 01/19, art. 42(3)), as well as approving the municipal waste management plan, which must align with the wilaya-level urban development plan (Law No. 01/19, art. 31(2)).
The governor's responsibilities include protecting citizens within the wilaya from health risks posed by epidemics and infectious diseases resulting from accumulated household waste in

streets and cities, especially in light of rapid demographic growth (Karnash, p. 211). Additionally, if a municipality fails to carry out required sanitation procedures, the governor is authorized to act in its place (Law No. 11/10, 2011, art. 100).

III.1.3. Directorate of Environment:
The Directorate of Environment was established in each wilaya pursuant to Executive Decree 03/434, amending and supplementing Executive Decree 96/60, which created an Environmental Inspectorate at the wilaya level (Executive Decree No. 03/434, 2003). This directorate works to protect the environment through waste prevention, reduction of household waste production, and rational treatment using modern and advanced technologies.It is also responsible for monitoring and enforcing laws and regulations related to household waste management, as well as implementing awareness and education programs in coordination with other relevant sectors (Makhnefer, 2015; see also Joint Ministerial Decision, art. 2, 28/08/2007)

III.2. The role of administrative bodies responsible for household waste management at the municipal level:

The municipality is the basic decentralized local community of the state (Law No. 11/10, art. 1). It enjoys numerous powers of critical importance in environmental protection and public health, as provided by municipal and environmental laws. In the area of household and similar waste management, the municipality is tasked with preparing a plan for managing such waste.

III.2.1. Municipal Waste Management Plan:
The head of the Municipal People's Council is responsible for preparing the municipal plan for household and similar waste management according to the model annexed to Executive Decree 07/205 (Executive Decree No. 07/205, 2007). When two or more municipalities, or the regional governor, jointly manage household waste, one of the municipal council heads is designated by peers to oversee the preparation, review, approval, and implementation of the plan (Executive Decree No. 07/205, art. 5).
The municipal waste management plan consists of three parts (Executive Decree No. 07/205, annex):

Part One: Includes the current organization of household waste management, similar waste, and inert waste within the municipality's jurisdiction:

a) Identification of urban activities generating household and similar waste and inert waste.
b) Characteristics of household and similar waste.
   i. Quantitative analysis of household and similar waste: the amount of waste generated by families, commercial activities, human institutions, and daily percentages.
   ii. Qualitative analysis of household and similar waste and physicochemical factors: moisture, calorific value, density, and waste components (organic materials, paper, cardboard, plastic, etc.).
   iii. Quantitative and qualitative analysis of inert waste.
c) Examination of the organization of the departments responsible for waste management.
   i. Number of employees and their qualifications.

ii. Collection patterns (routes, frequency, timing, coverage rate).
iii. Number and type of vehicles used, their capacity, operational status, downtime, and the effectiveness of the maintenance department.
iv. Examination of organizational deficiencies.
v. Assessment of the current cost of collecting, transporting, and processing waste.

d) Inventory and identification of locations and existing treatment facilities within the municipality (this includes: area, completed infrastructure, the type and quantity of disposed waste, and the associated environmental and health impacts).

Part Two: The new plan organizing the management of household waste, its generation, and inert waste:

a) Estimation of quantitative and qualitative development of household and similar waste and inert waste, taking into account demographic growth, economic development patterns, and the potential for waste reduction at the source.
b) Selection of options regarding waste collection, transport, and sorting systems, considering necessary economic and financial capacities, particularly:
   i. Proper division of municipalities into sectors.
   ii. Waste collection times, frequency, and rational routes.
   iii. Human and material resources required for waste collection and transport for each sector, considering terrain characteristics and population distribution.
   iv. Feasibility of implementing a selective collection system and specifying the necessary resources, particularly regarding equipment, training, awareness, and information campaigns.
   v. Possibility of organizing and developing waste recovery and valorization markets.
   vi. Identification of reforms needed for the municipal public service responsible for waste management.
   vii. Estimation and development of capacities for waste treatment, highlighting priorities for constructing new sorting and treatment facilities.

Part Three: Estimation of investments required for implementing the Municipal Household Waste Management Plan:

a) Methods for collecting household waste and similar waste:

The collection process aims to remove household and similar waste and involves two stages (Abdelli, p. 9):

- Stage 1: At the household level, individuals must collect waste and deposit it in waste containers at their residence, using bags.
- Stage 2: Waste is collected and transported by the municipality to treatment facilities.

There are several types of household waste collection:

i. Door-to-door collection (mixed collection): Waste removal services use collection trucks to pick up waste left by residents at designated times along public roads (Hafsi & Al-Laithi, p. 306).
ii. Voluntary contribution collection (communal collection): Citizens deposit waste in shared containers, such as bins or wheeled carts, placed in accessible locations (Kacem, p. 127).

iii. Selective or "separate collection": Waste is separated by type, with dedicated containers labeled for specific waste. This facilitates transportation and recycling, enabling reuse after reclassification. This method is commonly applied in cities with high environmental awareness (Makhnefer, p. 69). In Algeria, the National Agency for Waste Management established a selective sorting program; however, it has not been implemented nationwide, benefiting only 13 wilayas and 22 residential districts (Kacem, p. 128).

iv. Special collection: This method targets bulky household waste, which is otherwise disposed of haphazardly. Municipal services may remove such waste using door-to-door collection, on-demand collection, or delivery to sorting centers if available, using flatbed trucks or specialized compactor containers (Mostafawi, 2021, p. 174).

v. Household waste treatment methods: household and similar waste can be treated through incineration, landfilling, composting, and recycling.

vi. Incineration: This method uses direct or indirect heat to decompose organic compounds. It is suitable for some types of waste and reduces overall waste volume (Kebab, p. 284).

vii. Landfilling: It is a process of storing waste underground in a suitable pit, in which a layer of cement and a layer of rigid plastic are placed along its edges and base to prevent the leakage of liquids resulting from waste decomposition into the ground, in order to protect groundwater. When digging, the following conditions must be taken into account:
    - Located in non-permeable soil.
    - At least 200 m from residential areas and 500 m from water sources.
    - Positioned considering prevailing wind directions (Kacem, p. 129).

viii. Composting: A natural microbiological process where bacteria decompose complex organic matter, producing water vapor, carbon dioxide, simple organic substances, and nutrient-rich material similar to fertilizer. This is applied to fruit and vegetable waste from markets, sorted household waste, kitchen waste, and organic farm waste. Composting relies primarily on aerobic fermentation by bacteria present in household and similar waste (Hina, 2019, p. 63).

ix. Recycling: Defined as "the processing of waste through physical and chemical methods to obtain raw materials from solid waste and integrate them into the production cycle as partial or total replacements for original raw materials" (Hafifi, 2015, p. 77).

Recycling produces new materials recovered from waste by changing its nature before use—for example, converting industrial waste into organic fertilizer (Hafsi & Al-Laithi, p. 307). This method is an alternative, modern approach to household waste treatment, reducing air and water pollution caused by incineration and landfilling. It also decreases imports, creates local employment opportunities, and avoids the additional costs and health/environmental problems associated with traditional disposal methods (Kacem, p. 130).

IV- Conclusion:

The Algerian legislator has shown considerable concern regarding the issue of household waste and similar waste through the enactment of various laws and regulatory frameworks. These legal instruments define the powers and responsibilities of local administrative bodies and their role in the collection, transportation, and treatment of such waste, with the aim of preventing the environmental and public health risks it may generate.

However, from a practical standpoint, waste management methods in Algeria remain below the required standards. They continue to rely predominantly on traditional management techniques—namely incineration and landfilling—implemented by municipalities that often suffer from limited financial resources and insufficient specialized human capacities. This situation is further aggravated by the lack of effective coordination among the administrative bodies responsible for waste management.

Based on the findings of this study, the following recommendations are proposed:

- Revising and amending the legislative and regulatory framework governing household waste management, particularly with regard to recycling, while promoting and effectively implementing selective waste collection systems.
- Strengthening coordination among the administrative bodies entrusted with waste management and enhancing the role of municipalities by improving their material and human resources and by adopting modern management techniques such as composting and recycling.
- Promoting cooperation between the public and private sectors, as well as civil society, in the field of waste recycling in order to achieve environmental and economic sustainability.
- Organizing training sessions and awareness campaigns targeting workers, officials, and civil society to disseminate knowledge and raise awareness about the negative impacts of the indiscriminate disposal of household and similar waste.

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