International Research Journal of Innovations in Engineering and Technology (IRJIET)

ISSN (online): 2581-3048
Volume 7, Issue 8, pp 30-35, August-2023
https://doi.org/10.47001/IRJIET/2023.708005

Evaluation of the Quantity of Household Garbage Discarded by Type of Habitat and by Household Size during 6 Days

Application: Case of the Five Communes of Conakry, Guinea

[1]Sonty MARA, [2]N'Faly FOFANA, [3]Aissatou Lamarana BAH, [4]*Yacouba CAMARA

[1]Institut Supérieur Agronomique et Vétérinaire de Faranah, Département des Eaux et Forêts-Environnement, BP: 131, Guinée
[2]Institut Supérieur Agronomique et Vétérinaire de Faranah, Département Agroforesterie, BP: 131, Guinée
[3]Centre de Recherche en Gestion des Déchets (CREGED) de Conakry, Guinée
[4]Institut Supérieur de Technologie de Mamou, Département Energétique, BP: 63, Guinée
*Corresponding Author's E-mail: cyacouba90@gmail.com

***Abstract* - This present study aims to evaluate the quantity of household waste rejected by type of habitat and by household size for 6 days for the city of Conakry in the Republic of Guinea. This study focused on the five (5) municipalities of the city of Conakry, namely: Matoto, Matam, Kaloum, Dixin and Ratoma. The habitats were classified by size as follows: high standing, medium standing and low standing. The main results obtained during this research are as follows: for the Municipality of Matoto, the quantity of household waste rejected during 6 days at the level of the High standing habitat is (99.1 kg), that of Low standing is 94.4 kg and for the Medium standing is 87.7 kg, although the household size at the High Standing level is smaller nine (9) people compared to the other two with eleven (11) people respectively. This difference could be due to the difference in the purchasing power of the constituent members of the different levels that is to say simply the difference in the standard of living. For the Commune of Ratoma, the greatest quantity is observed at the level of the Low standing (99.8 kg) followed by the High standing with 94.7 kg of garbage. This situation can be explained by the size of the Commune with a large population, as well as the large number of sources of waste production that are the many markets and the many units of packaging factories of all kinds.**

Keywords: Evaluation, quantity, waste, households, municipalities, Guinea.

I. INTRODUCTION

The demographic growth of the city of Conakry during these two decades is not without consequences on the production and management of household solid waste. Thus, from 600 tons in 1996, the production of solid waste in this city increased to 500,000 tons in 2017. According to Modi (2018), less than 30% of this waste is organized collection and 70% is piled up, dumped through the city. The main modes of disposal of household waste are discharge into nature, open spaces, rivers, the sea, gutters, roadsides, etc. In all cities of Guinea, landfills are not controlled and garbage transfer systems are inadequate. This has serious consequences for the environment, human health, the living environment, etc. Conakry is the capital of Guinea and the country's largest city. It is located on the Atlantic Ocean. It has an area of 450 km^2 with a high density of 4800 inhabitants/km^2 that is a population of 2,160,000 inhabitants. Studies show that the production of waste is estimated at 0.60 kg/inhabitant/day [1-3].

It is therefore imperative and judicious to focus current research on adequate site-specific and innovative strategies to improve solid waste management household. Nowadays, the proliferation of residual materials in general and plastic waste in particular is a major socio-ecological concern in the city of Conakry. The integrated approach in the analysis of the issues associated with plastic waste management has led us to understand the informal waste management environment as a whole. This analysis is based on understanding the interactions between the main issues, namely the ecological, socio-economic, cultural and political issues. Indeed, the intervention of collectors, intermediary wholesale operators and waste recycling units have not achieved the objective relating to the improvement of the living environment of the populations.

The choice of this theme constitutes an ambition to contribute to the improvement of the quality of the living environment of the populations of this city. Our work focuses on plastic waste with a thickness less than or equal to 50 microns of the LDPE type and which are supplied to consumers at points of sale of goods or products. This choice is explained by the fact that this plastic waste constitutes one of the most visible factors of the nuisance caused by them through the disfigurement of the urban landscape, as a consequence of their invasion.

International Research Journal of Innovations in Engineering and Technology (IRJIET)

ISSN (online): 2581-3048

Volume 7, Issue 8, pp 30-35, August-2023

https://doi.org/10.47001/IRJIET/2023.708005

II. PROBLEMS

A) General problem

Etymologically, the word “waste” comes from the Latin Cadre which means to fall. The root “dis” means estrangement and separation. Waste is a good that, a priori, has no market value. Sociologically, waste reflects the social level of populations and the space in which they live: between rural/urban areas, collectives/individuals. In addition, Ordinance No. 045/PRG/87 of the Environmental Code in Guinea, laying down the framework law, in its article 58 defines the term "waste" as any residue from a process of production, use, or any movable property abandoned or destined for abandonment. There are several types of waste (household, industrial, hospital). In the context of this study, only plastic waste is taken into account.

Plastic is not only used to protect our food, which gives it a hygienic function, while its use in the automotive industry as a replacement for heavier material also has a beneficial impact on consumption [4].

On the other hand, according to the César Franck College [5], plastic bags are a considerable source of pollution throughout their life cycle. It appears that their recycling is not profitable from an ecological and economic point of view.

According to the Eco-packaging organization [6], plastic bags are too light to be recycled, and recycling them consumes more resources than they return. Plastic currently poses serious problems, both for health and the environment. Indeed, the effective decomposition of polyethylene in the natural environment takes about 1000 years.

Thus, in addition to their impacts on health, unsustainable waste management also contributes to climate change [7].

The solution to reduce pollution from plastic waste would obviously be to ban their use [8]. This prohibition, effective in the regulations of most countries, often proves difficult to apply, if not impossible, given the economic interests at stake locally.

Environmental impacts and their cause

From a health perspective, exposure to harmful chemicals during manufacturing, absorption of these from food packaged in plastic, or chewing of plastic toys by children can, for example, cause cancer, birth defects, endocrine dysfunction or have developmental and reproductive effects [9].

These impacts can be grouped into:

a) Health impacts: which are perceptible on the immune system and the respiratory system, endocrine disruption, reduced fertility, increased risk of cancer, among others. These effects exist at each stage of the plastic's life cycle and therefore multiply the consequences on health [10].
b) Impacts on livestock: The animals most exposed to plastics are especially domestic animals which are generally stray and encounter plastics of all kinds (bags, wicks, etc.)
c) Impacts on the living environment of urban agglomerations: which is degraded with the proliferation of plastic bags, generally white and black in nature? This can contribute to giving a bad image of the healthiness of the country in the eyes of foreigners.
d) They can also cause clogging of gutters, while facilitating the proliferation of mosquitoes and odors and causing flooding in large cities.
e) Impacts on agriculture: The proliferation of plastic waste and the presence of plastic bags in agricultural areas have remarkable impacts such as:
    - Visual soil pollution;
    - The reduction of agricultural spaces and of the soil infiltration coefficient;
    - Decline in agricultural yield, among others.
f) Impacts on water resources: In the absence of an effective collection system, plastic waste, especially plastic bags, litter the ground where they gradually bury themselves, all the more slowly as the ground is hard. The use of waste mixed with plastic bags as backfill in cultivated soils contributes to the reduction of the infiltration rate and an increase in runoff and therefore flooding.

B) Specific problem

In the Republic of Guinea, throughout the city of Conakry, the gutters are clogged with plastic waste. Approximately 3,473 tonnes of plastic waste ends up in garbage cans each year [11].

The issue of urban waste is a problem that arises both locally and globally. Indeed, their ever-increasing production is one of the characteristic features of the evolution of our societies, whether in urban or rural communities. Waste increases, diversifies, amplifies due to population growth, the modernization of the way of life linked to industrial development and consumer technology (Kabore 2009).

Commonly called in the local language "foré sac" translated by "plastic bag", by the "Conakrykas", plastic waste invades the city. Whatever you buy, you will be entitled to your little plastic bag, very weak, which is sometimes doubled by a second to play its role of protection and transport.

International Research Journal of Innovations in Engineering and Technology (IRJIET)

ISSN (online): 2581-3048

Volume 7, Issue 8, pp 30-35, August-2023

https://doi.org/10.47001/IRJIET/2023.708005

Mineral water sachets can be found on every street corner to satisfy the population's desire to drink. But once emptied of its contents, it is directly thrown on the ground [11].

This plastic waste is indeed very polluting and harmful to health. In addition, the lack of organization of the structures involved in waste management added to the incivility of the population leads to wild and uncontrolled dumps all over the district. Households throw garbage in inappropriate places, in the streets, on unoccupied land, near the sea... All this leads to a deterioration of the living environment of the populations [12].

In Conakry, beyond the insalubrity caused by the proliferation of waste, other problems are linked to the phenomenon, including:

- The proliferation of water-related diseases (plastic waste blocks the evacuation of rainwater and waste water, thus promoting the multiplication of breeding grounds for mosquitoes and flies that are vectors of diseases such as malaria, diarrhea, etc.) ;
- The absence of regulations governing the management of household waste, including plastics.

This is why the study seeks to answer the following question: what are the issues related to the management of plastic waste? To answer this question, the research objectives are presented below.

III. MAIN OBJECTIVE

Due to the lack of reliable scientific data on the one hand, and the need for management of household solid waste on the other hand, and taking into account local realities, the present study has the general objective of proposing an efficient and sustainable sector of plastic waste management in the city of Conakry in order to contribute to the reduction of household solid waste flows.

This general objective pursues three specific objectives, namely:

- Determine the quantity of household waste discarded by type of habitat and by household size for 6 days in the five municipalities of the city of Conakry;
- Assess the impact related to their management;
- Propose a controlled technology for their treatment.

IV. METHODOLOGY

The methodological approach used in relation to the specific objectives of the research relates to the exploration of the field, the collection of data as well as the organization, processing and analysis of this data.

Data collection took place from June 2021 to May 2022 from waste management stakeholders, in markets and in households.

V. RESULTS AND DISCUSSION

The results obtained at the end of this work are presented in the tables below (from 1 to 5) and relate to: Evaluation of the quantity of household waste rejected by type of habitat and by size of household for 6 days. Application: Case of the five municipalities of the city of Conakry, Guinea.

Table 1: Quantity of Household Waste Discharged By Type of Housing and By Size of Household during 6 Days, Municipality of Matoto, Guinea

Type of habitat	Filling time (in days)	Household size	Quantity found (Kg)
High Standards	6	9	99,1
Medium standing	6	11	87,7
Low standing	6	11	94,4
Total Average	**6**	**10**	**93,73**

Table 1 shows that in the Municipality of Matoto, the quantity of household waste rejected during 6 days at the level of the High Standing habitat is greater (99.1 kg) than that produced by the others, namely 94.4 kg for the Low standing and 87.7 kg for the Medium standing, although the size of the household at the High Standing level is smaller nine (9) people compared to the other two with eleven (11) people respectively. This difference could be due to the difference in the purchasing power of the constituent members of the different levels that is to say simply the difference in the standard of living. It should perhaps be added that Matoto, which is one of the largest municipalities in Conakry, is also the one which is home to a large number of small plastic packaging manufacturing companies as well as many popular markets and which are sources of this household waste.

International Research Journal of Innovations in Engineering and Technology (IRJIET)
ISSN (online): 2581-3048
Volume 7, Issue 8, pp 30-35, August-2023
https://doi.org/10.47001/IRJIET/2023.708005

Table 2: Quantity of Household Waste Discharged By Type of Housing and By Size of Household during 6 Days, Municipality of Matam, Guinea

Type of habitat	Filling time (in days)	Household size	Quantity found (Kg)
High Standards	6	9	64,35
Medium standing	6	11	69,09
Low standing	6	11	66 ,39
Total Average	**6**	**10**	**66, 61**

Observation of the results in Table 2 shows that in the Municipality of Matam, the quantity of household waste discarded for 6 days is rather greater at the level of Moyen standing (69.09 kg) with eleven (11) people/household compared to at the Low standing which produced 66.39kg, while the High standing rejected only 64.35kg with eleven (11) people and nine (9) people respectively. The size of this municipality (low population) explains the low production of household waste compared to the Municipality of Matoto, as well as the low level of waste production sources (multiplicity of markets and packaging production factories).

Table 3: Quantity of Household Waste Discharged By Type of Housing and By Size of Household during 6 Days, Municipality of Kaloum, Guinea

Type of habitat	Filling time (in days)	Household size	Quantity found (Kg)
High Standards	6	9	49,36
Medium standing	6	11	44,29
Low standing	6	11	46,59
Total Average	**6**	**10**	**46,74**

The results of table 3 concerning the Commune of Kaloum, with regard to the quantity of household waste rejected by type of habitat and by size of household during 6 days indicate that the High standing comes first with a production of 49.36 kg, followed by the Low standing with 46.59 kg of garbage. This situation is similar to that of the Municipality of Matoto, except that the quantity of household waste produced is very different because of the difference between them in terms of population and the existence or not of sources of waste production (multiplicity of packaging production markets and factories).

Table 4: Quantity of Household Waste Discharged By Type of Housing and By Size of Household during 6 Days, Municipality of Dixin, Guinea

Type of habitat	Filling time (in days)	Household size	Quantity found (Kg)
High Standards	6	9	53,42
Medium standing	6	11	59,39
Low standing	6	11	57,73
Total Average	**6**	**10**	**56,85**

According to the analyses, the results observed in Table 4 are similar to those of Table 2 (Municipality of Matam). The quantity of household waste rejected in 6 days at the level of the Middle standing is greater (59.39 kg) than that produced by the Low standing (57.73 kg). At this level too, the size of this municipality (low population) explains the low production of household waste compared to that of the Municipality of Matoto, as well as the low level of sources of waste production (multiplicity of markets and factories of production of packaging).

Table 5: Quantity of Household Waste Discharged By Type of Housing and By Size of Household during 6 Days, Municipality of Ratoma, Guinea

Type of habitat	Filling time (in days)	Household size	Quantity found (Kg)
High Standards	6	9	94,7
Medium standing	6	11	87,9
Low standing	6	11	99,8
Total Average	**6**	**10**	**94,13**

The results in Table 5 indicate that the quantity of household waste discarded for 6 days in the Municipality of Ratoma is greater at the level of Low standing (99.8 kg) followed by High standing with 94.7 kg of garbage. This situation can be explained

ISSN (online): 2581-3048
Volume 7, Issue 8, pp 30-35, August-2023
https://doi.org/10.47001/IRJIET/2023.708005

by the size of the Commune with a large population, as well as the large number of sources of waste production that are the many markets and the many units of packaging factories of all kinds.

In view of all these analyzes and interpretations of results, one could say that the production of plastic waste today constitutes a social phenomenon that is underpinned by the new habits born of modernization. The growing needs are justified not only by galloping population growth, but also by the many upheavals that have occurred in our way of life. In Conakry in particular, all the measures envisaged for the management of this plastic waste, despite all the efforts made by the rulers, fail to produce the desired results. It is necessary to change methodology or approach on the institutional, legal, moral and operational levels to improve the state of health of our city.

VI. RECOMMENDATIONS

The management of plastic packaging waste poses enormous problems in the City of Conakry (recovery, collection and recycling). Many studies have been carried out on the waste management system but the production system of this waste remains a little explored area, especially with regard to plastic packaging waste.

Accordingly, the framework for the necessary action should be based on a hierarchy of objectives and focus on the following four broad areas of activity:

a) Minimize, i.e. minimise, waste;
b) Maximize the environmentally sound reuse and recycling of waste;
c) Promote the environmentally sound treatment and disposal of waste;
d) Expand waste services.

The four areas of activity are interdependent and complementary and should therefore be integrated in order to provide a general and environmentally conscious framework for managing municipal solid waste. The relative importance given to each of them will vary according to local socio-economic and physical conditions, the volume of waste produced and its composition. All sectors of society should participate in all areas of activity.

VII. CONCLUSION

It is with a view to better knowing the quantity of household waste rejected by type of habitat and by household size for 6 days for the five (5) communes of Conakry in the Republic of Guinea that we were interested in this study. This study led us to know the quantities of waste rejected by size of household according to the classification of the dwellings that we carried out. Among the five municipalities in which we carried out our studies, we found that it is in two municipalities where the quantities of discharges are considerable compared to the other three municipalities. These two municipalities are Matoto and Ratoma, whose quantities of waste discharged into the environment are respectively (99.1 kg) for high standing housing and (99.8 kg) at low standing level. This difference could be due to the difference in the purchasing power of the constituent members of the different levels and the size of the Communes with a large population, as well as the sources of waste production which are the numerous markets and the numerous units of factories packaging of all kinds.

REFERENCES

[1] GBILIMOU, A., SIDIBE, D., YABI, I., and CAMARA, Y. (2022) Caractérisation des déchets managers de Conakry characterization of solid household waste in Conakry, African Scientific Journal, Management and Economic Development, vol.3, numéro 12.
[2] Banque Mondiale. (2018) What a Waste 2.0 : A Global Snapshot of Solid Waste Management to 2050 (p. 295p).
[3] Alexandra, L. C., Jean-Pierre, Y., & Dr Sanjay K Gupta, G. (2012) LES DÉCHETS: QUELS ENJEUX POUR LES PAYS EN DÉVELOPMENT ? 15, 28.
[4] Madam, C. (2003) La valorisation des matières plastiques en fin de vie: Etat des lieux et propositions d'amélioration. Bruxelles: Université Libre de Bruxelles. [En ligne] mem-envi.ulb.ac.be/Mémoires. Récupéré le 01 juillet 2023. 95p.
[5] Collège César Franck, (2013) les plastiques en débat grand concours pour les collèges, 8 février 2013.
[6] Fabrégat, S. (2011) Actu Environnement, Réussir la transition, Eco-Emballages teste le recyclage de tous les emballages plastiques. En ligne le 01 juillet 2023.
[7] Toguyeni, A. R. (2006) La gestion des déchets solides de la ville de Ouagadougou (Burkina faso): Etat des lieux et analyse de la problématique déchets d'emballages plastiques, mémoire de DES. Université libre de Bruxelles(Belgique). [En ligne] memenvi.ulb.ac.be/Mémoires, 130p. Récupéré le 01juillet 2023.
[8] Ouédraogo, G. N. (2009) Engager les communautés locales à se préparer à vivre avec les changements climatiques : cas de l'incinération des sachets plastiques dans la ville de Dédougou.Asdi SMHI. p19. Rapport.

ISSN (online): 2581-3048
Volume 7, Issue 8, pp 30-35, August-2023
https://doi.org/10.47001/IRJIET/2023.708005

[9] Afrique Economie, (2019) La Guinée professionnalise la gestion des déchets à Conakry. En ligne sur www.rfi.fr le 01 juillet 2023.

[10] ADEME F. (1993) Méthode de caractérisation des ordures ménagères, MODECOM - Manuel de base - édité par l'Ademe Centre d'Angers, Septembre 1993 - Réf 1601 - Coll., « Connaître pour agir », 64p.

[11] Sidibé, M. L. (2011). Mémoire: Proposition de filières de valorisation des déchets plastiques Conakry: Master ECOGED Université de Cergy (France), (p.51-57).

[12] Natabou. M. (2007). Le problème d'insalubrité au Bénin : Etude du cas de la ville de Cotonou, enjeux et approches de solutions ; Mémoire de fin de formation, FLASH/UAC, 98p.

Citation of this Article:

Sonty MARA, N'Faly FOFANA, Aissatou Lamarana BAH, Yacouba CAMARA, "Evaluation of the Quantity of Household Garbage Discarded by Type of Habitat and by Household Size during 6 Days. Application: Case of the Five Communes of Conakry, Guinea" Published in *International Research Journal of Innovations in Engineering and Technology - IRJIET*, Volume 7, Issue 8, pp 30-35, August 2023. Article DOI https://doi.org/10.47001/IRJIET/2023.708005

****

