



CONSEQUENCES OF THE MANAGEMENT OF SOLID HOUSEHOLD WASTE ON THE ENVIRONMENT AND HUMAN HEALTH IN THE MUNICIPALITY OF ALLADA IN BENIN

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ABSTRACT

The present survey identifies the consequences of the mechanism of management of the strong and domestic garbage on the health human of the populations and the environment in the Township of Allada. The works of land partners to the documentary research permitted to know how to become him of the domestic strong garbage of Allada and his/her/its risks on the environment and the human health. The PEIR model has been used for the analysis of the results. The results show that the households constitute the big sources of production of the garbage with 55% of no degradable nature, 43 % biodegradable nature, and 2 % of dangerous. The commercial activities constitute the second sources of production that are largely of biodegradable nature (70 %), according to people investigated. Besides, the main fashions of management adopted by (82 %) of the populations investigated are the dismissal on the garbage dumps savage, the wild incineration and the burying. He/it is also noted in the middle a weak rate of subscription of the households investigated (20 %) to the structures of pre-collection.

Key words: Allada, consequences, Management of the garbage, impact, environment.

INTRODUCTION

In Benin, the environmental problem, especially linked to the increase in the population by the high urban birth rate and by the rural exodus of young people combined with new lifestyles, arises in terms of lack of means for the management of the waste produced, insufficient free space for its deposit, treatment and others. In reality, with a chronic lack of equipment in terms of collective sanitation, households often invent individually multiple strategies to dispose of their waste. Moreover, the management of waste in general and that of solid household waste in particular, is today difficult for stakeholders in urban management including the municipal authorities and pre-collection NGOs. But overwhelmed and aware of the hygiene and sanitation problems which weaken their state of health, the populations took initiatives going in the direction of the management of said waste. However, the main actors that are the carters involved in this pre-collection activity are subject to several technical and health risks (Adam, 2007). In the Municipality of Allada, the problem of managing solid household waste is poses with acuity. Indeed, the increase in population coupled with the multiplication of socio-economic activities which are the main sources of solid waste production, the removal of which constitutes a headache for the municipal authorities. As a result, it becomes essential to integrate respect for the environment into economic development policies for the benefit of present and future generations. What are the environmental and health impacts of the different types of waste management practiced by the population?

The Municipality of Allada is located between the parallels 6 ° 36 'and 6 ° 47' north latitude and between the meridians 1 ° 58 'and 2 ° 15' east longitude. It is bounded to the north by the Municipality of Toffo, to the South by the Municipality of Tori-bossito, to the east by the Municipality of Zè and to the west by the Municipalities of Kpomassè and Bopa (Figure 1).

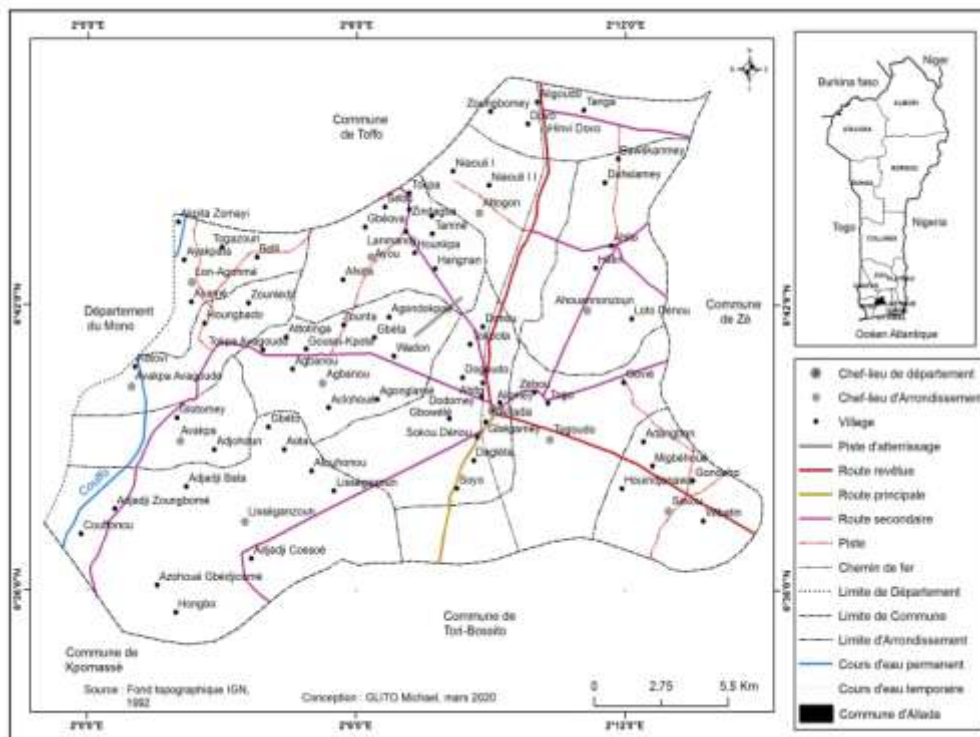


Figure 1: Geographic and administrative locations of the Municipality of Allada

1. Methodological approach

As part of this research, certain data were taken into account:

Data and information on domestic waste management methods. These data are collected during field surveys in order to better understand the causes and the real sources of waste production in the Municipality of Allada; Epidemiological data on the main ailments linked to poor waste management in the Municipality of Allada collected in real life;

Qualitative data from socio-anthropological investigations which have made it possible to understand the perception of the populations on the impacts linked to the handling of waste. The surveys were carried out with 150 people made up of the carters, responsible for the pre-collection structure, households; market gardeners; rural development agents and municipal authorities.

The sample size was calculated using the following formula:

$$X = \frac{(Z\alpha)^2 \times p(1-p)}{e^2} \text{ according to Schwartz's probabilistic method (1995).}$$

X = sample size, $Z\alpha = 1.96$ reduced deviation corresponding to an α risk of 5%; $p = n/N$ with p = proportion of households in the municipality of Allada, n = number of households by village or neighborhood, N = total number of households in the municipality of Allada and e = desired precision equal to 5%. Thus, $p = n/N = 5040/40424 = 0,12$ or 12 %, with $n = 5040$, $N = 40424$. $e^2 =$ random error rate = 5 % = 0,05.

Questionnaires, interview guides and observation grids were subject to manual examination. The data collected was processed using the Excel spreadsheet.

2. Results / Discussion

2.1 Origin of waste

The different categories of waste produced in households and markets in the research sector have different origins. They come from human and natural actions.

In fact, more than 60% of those surveyed recognize that households are an important source of waste production. Most of a man's basic needs find their point of direct satisfaction in the household: food, clothing and housing.

Besides households, there are other sources of waste production. On the one hand we have those related to socio-professional activities: welding, hairdressing, market, hospital, industries, sewing, mechanics, carpentry, etc. On the other hand we have the waste which is linked to natural factors. Indeed the wind which blows by breaking the branches of trees and spreads waste everywhere. The same is true for runoff in times of rain.

2.2 Typology of waste

The waste produced in the research sector falls into two categories: solid waste and liquid waste.

With regard to solid waste, there are two types, namely: biodegradable waste and non-biodegradable waste.

Table I shows the main substances contained in the waste.

Table I: Chemical components of household waste

N°	Waste	Component	Chemical formulas
1	Putrescible Plants and Debris	Byfuric acids	HB
2	Plastics	Hydrofluoric acid	HF
		Sulphur dioxide	SO ₂
		Nitrogen oxides	NO _x
		Polycyclic aromatic hydrocarbons	HAP
3	Cardboard papers	Arsenic	As
		Cadmium	Cd
4	Fabrics	Cadmium	Cd
5	Battery	Dioxins and furans	PCDD et PCDF
6	Metals	Lead	(Pb)
		Mercury	(Hg)
		Chromium	(Cr)
		Copper	(Cu)
7	Glass	Manganese	Mn
		Nickel	Ni
8	Shoes and leathers	Arsenic	As
		Hydrofluoric acid	HF
9	Snails and bones	Hydrochloric acid	HCl
10	Inert sands	None	
11	Wood	Hydrochloric acid	HCl

Data source: 2019 field surveys

On the basis of the results in Table I, it can be seen that several chemical components are generated by household solid waste. Of these components, gaseous effluents, pose an extremely high risk to human health. Mercury, lead and other heavy metals represent fairly high risks of pollution to the aquatic ecosystems of rivers and streams (Haslay, 1993).

2.3 Waste management methods

1. Waste management methods

1) 2.3.1. Waste disposal on the dumpsites

For years, the Municipality of Allada has been renowned for selling snails. Until then, people have found no other way than to throw the shells all over the place when they are not rotten in a short time.

Photo 1 shows a wild dump of snail coquis in the Allomey district.



Photo 1: Snail dump site in Allomey
Shooting: Glito September 2019

Photo 1 shows that these shells conserve water and by their nature become cocoons of larvae of malaria-carrying mosquitoes. This photo shows empty spaces used by users to manage the waste produced. Most of the respondents found this technique to be the most used. This situation is explained by the fact that there are around homes, undeveloped plots and the insufficiency of refuse boats. For the majority of those surveyed, this practice creates inconvenience, especially during the rainy season.

2.3.2. Incineration practice

This technique involves burning the waste produced. Photo 2 shows one of the main waste management methods used in the Municipality



2) **Photo 2:** incineration of garbage heap of different waste in Allomey

3) **Shooting:** GLITO, September 2019

4) It appears from the observation in photo 2 that more than half of the users surveyed (74%) know that this technique on site is used for biodegradable waste, in particular cardboard, packaging made of paper sheets which turn into ash afterwards. the operation. The incineration of garbage also poses a threat to the environment with these trails of smoke released into the atmosphere.

2.3.3 Collection by the carters

Field work has shown that the working conditions of the carters vary from one household to another. For example, at Buruli of Allada Ulcer Hospital, carters place trailers in which patients put garbage. So when they arrive, they mend them on their tractors. Here is an illustration of it in Plate 1.



Plate 1: Charts from the NGO ALDE - TOMA

Shooting: GLITO September 2019

Analysis of the photos (1.1 and 1.2) of Plate 1 shows that this collection structure does not distinguish between the different types of waste. She just collects them without any selection. This option poses a huge risk to the health of the population.

Unfortunately, since the town hall has not defined a site for dumping rubbish, these carters are content to simply pour their collections in the wild or in the field of a third party who would need it to make compost, or on the wild dumpsites.

Figure 2 shows the main types of waste management practiced in the Municipality.

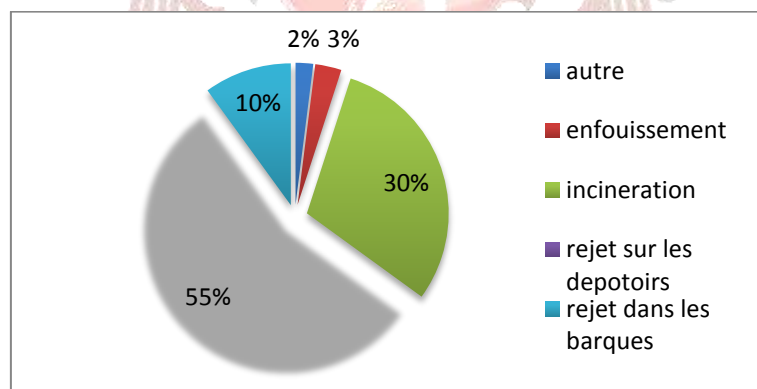


Figure 2: Waste management methods.

Source: Field survey, December 2019

It appears from the analysis of Figure 2, that the technique of dumping on wild dumps 55% and incineration 30% constitute the main methods of managing the waste produced according to the respondents. This situation is explained by the availability of unoccupied spaces, the lack of pre-collection equipment and the inadequacy of pre-collection structures, in particular NGOs. These different modes of waste management make the Municipality unhealthy and cause nuisance for the environment and for the health of the population.

3. Environmental impacts and pathological risks linked to poor waste management

Our research has looked at the impacts of poor waste management on the natural and human environment. After identification, here are some key components of the affected environments:

- components of the natural environment: water, soil and air quality;
- components of the human environment: human health, the economy, etc.

3.1. Health risks linked to poor waste management

Poor waste management promotes the multiplication of pathological germs in the Municipality of Allada. Without doubt, the accumulation of waste promotes the proliferation of pathogenic germs and other microbes which through water, food and air transmit infectious and parasitic digestive diseases like cholera, diarrhea, ailments stomach and malaria. To these diseases are added others such as headache, asthenia, bronchopulmonary infections, risks of liver cancer, corneal ulceration of the eye, conjunctivitis, migraines, etc. For health workers (100%), these ailments are mainly linked to the poor hygiene of users who expose meals to the open air and who do not sometimes wash their hands before eating.

Figure 3 shows the main cases of diseases frequently recorded in the Allada health center.

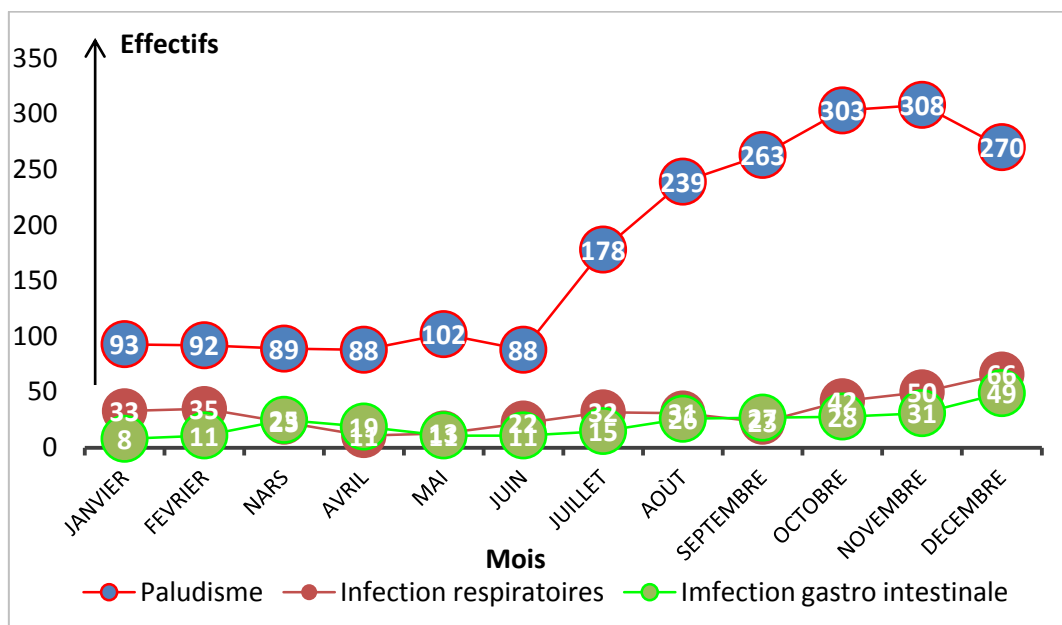


Figure 3: Main cases of diseases linked to poor waste management

Source: Allada Health Center, January, 2019

The analysis in Figure 3 shows that unhealthy conditions hinder the health of populations, and in turn, well-being and even development. Indeed, due to poor waste management and lack of hygiene in the research sector, more than 2,756 people in 2016 were infected. Malaria is followed by respiratory infections. As for gastrointestinal infections, they are the least recorded. The extent of these infections is explained by poor waste management, which favors the proliferation of mosquito larvae and parasites, the release of foul odors, gases and hygienic conditions that do not meet standards.

3.2. Measures and proposed solutions for improving the management of solid household waste

There are two ways to effectively manage household solid waste in the research sector. It is about the recovery (Agricultural, Energy and others) of household solid waste and the participation of local populations in the management of household solid waste.

CONCLUSION

At the end of this research, it should be remembered that several modes of waste management have been identified. These include dumping into the wild dumps, cremation and landfill. These modes constitute pollution factors of the environmental components. Furthermore, the option chosen for sustainable management is the recovery of waste through selective sorting at source, composting and capacity building of local actors through real participation.

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