

# **Strategies of Management of the Garbage Housewives in the City of Pobè (Benin, West Africa): Diagnosis and Approaches of Solutions**

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**ABSTRACT:** One of the difficulties that the population of Pobè feels is the one of the management of her garbage. This survey diagnoses the present fashions of management of the domestic garbage in the city of Pobè and propose some approaches of solutions. The documentary research, the investigations of land achieved by 256 households, completed by people list resources investigate, permitted to collect socioeconomic data, of the data on statistics on the pre-collection of the garbage,.... The results gotten after treatment of the data show that 46.06 % of the households incinerate garbage, 32.12 % bury them and 21.82 % reject them in the trash cans. Consequence, the populations cohabit with the garbage, inhale the odors descended of the putrefaction of garbage in spite of the orientations of the public hygiene code. This insalubrity is at the origin of the occurrence of 35 % of affections dermatological, of 43% of gastro-intestinal, of 13 % of febrile diarrhea, of 7 % of other illnesses diarrhetic and 2% of cholera in the city of Pobè. It comes back to the local and state-controlled authorities with the involvement of the populations to experiment other strategies of management of garbage of the city of Pobè.

**KEYWORDS:** Bénin, Pobè, management of the garbage, water illnesses

## **I. INTRODUCTION**

During the twentieth century, the world has known rapid population growth. Of 1,6 billion in 1900 to 7.2 billions in 2015, the World population is estimated at 9.6 billion in 2050 (United Nations, cite par Vigninou et al. [1]). In the developing countries in general and in Africa in particular, this demographic explosion has led the accumulation of household waste, etc. from anthropogenic activities in spite of the numerous actions led by the States (Onibokun [2]).

In Benin, most levels of systems management and environmental planning put in place by the authorities to various levels facing the growth of the production of garbage only give little satisfaction (Vigninou, [3]).

In the city of Pobè, the demographic thrust and the evolution of the generating activities of incomes entailed a production increased of important quantities of domestic garbage (Dansou [4]). But these garbage's are managed on the subject in conditions contrary to those prescribed by the texts. It entails serious repercussions on the environment and on the human health. The city of Pobè is situated in the department of the Tray, to the

# International Journal of Innovative Research in Science, Engineering and Technology

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Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 2, February 2017

Southeast of Republic of Benin on the Atlantic coast enters 6°55' and 7°00' of North latitude and 2°37' and 2°41' of East longitude (fig1). The city of Pobè spreads on a surface of 160 km<sup>2</sup> and shelter a population of 49 165 in 2013 (INSAE [5]). On the administrative plan, the city of Pobè counts twelve (12) districts.

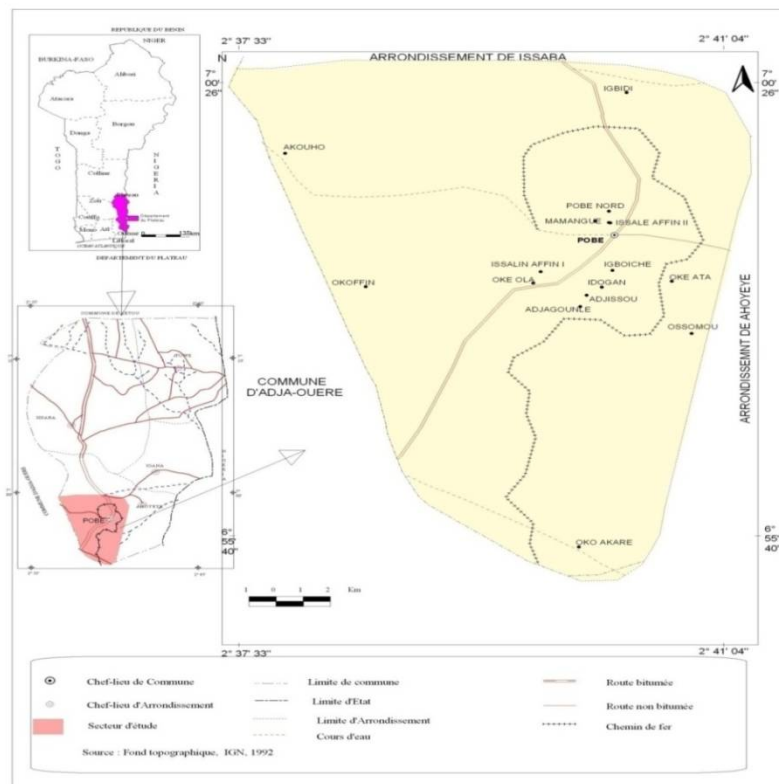


Fig.1: Situation of the city of Pobè

This survey has for objective to diagnose the present fashions of household waste management in the city of Pobè in order to make sustainable proposals at the place of the populations and decision-makers.

## II. RELATED WORK

The survey took in account several data. It is about statistics on the pre-collection of the household waste gotten by the NGO APESaB, of the chiefs of district / town boroughs of the precincts and during the documentation to the town hall of Pobè; of the data on the fashions of management of the aforesaid garbage; of the data on the distances that separate the heaps of garbage of the dwellings,.... statistics on the illnesses have also been collected. They cover the period 1999-2013 because of the data available to the hospital of zone of Pobè and to the Departmental Direction of the health/Ouémé-Plateau. These data have been completed by those collected by 256 households investigated according to the statistical protocol of Le Maux [6] while taking into account the state of unhealthy of their setting of life and 18 people resources interviewees.

Different fashions of management of the garbage have been listed from the investigations. Their analysis has been made by using the literature review based on waste management standards in Benin. Besides, the different

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notes taken at the time of the observations to this topic were the subject of comparison, appreciation and synthesis. To this effect, the triangulation of the data was the technique adopted for the analysis of the information collected. It helped to correlate the results obtained with other sources. Health statistics were processed and analyzed using the tools of descriptive statistics.

Diagnosis of current patterns of household waste management in the city of Pobè focused on the strengths, weaknesses, opportunities and threats existing legislative and regulatory mechanisms to ensure sound management of wastes. Facing the sanitary risks bound to a bad management of the sector, some lasting solutions have been proposed.

### III. RESULTS AND DISCUSSION

In the city of Pobè, population growth is a factor in the generation of waste in households.

#### A. POPULATION DYNAMICS, FACTOR OF WASTE PRODUCTION

The economic development of the city of Pobè led the rapid growth of its population. The population of the town of Pobè grew from 23,427 inhabitants in 1992 to 49,165 inhabitants in 2013[5](fig. 2).

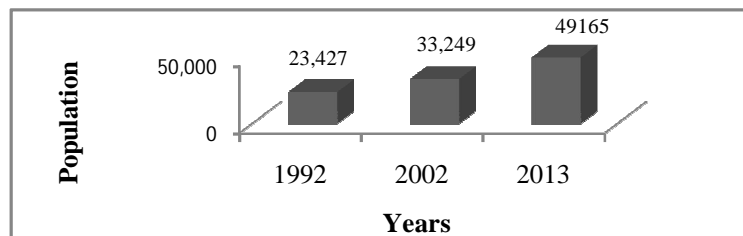


Fig. 2: Population trends of the city of Pobè 1992 to 2013

The fig.2 shows the evolution of the population by 1992 to 2013. It shows that the population of the city of Pobè has increased by 1226 inhabitants over the period 1992-2013. This fact is justified by the arrival of Mahi, Gun, Adja, etc. in search of fertile land [4]. This demographic growth has some consequences on the management of the garbage in the city because, as the strength of the population increases, the quantity of garbage increases (fig.3).

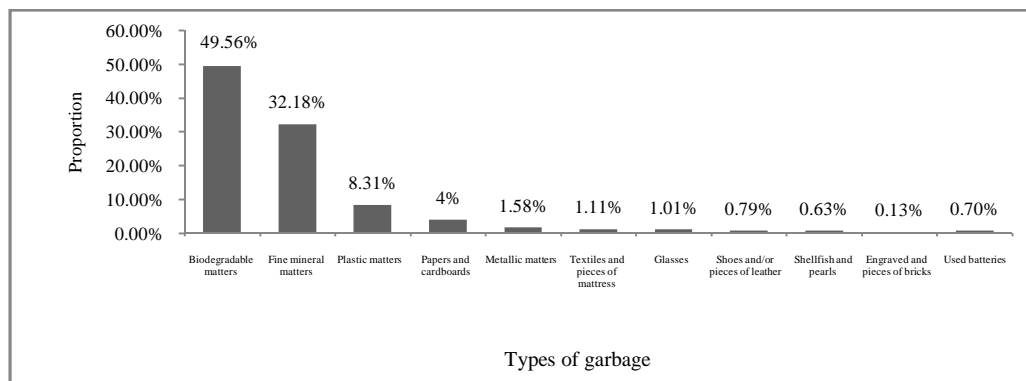


Figure 3: Composition of household waste in the city of Pobè

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The figure shows that 49,56 % of the waste collected are constituted of biodegradable matters of which mostly kitchen waste (food scraps, fruit peels, vegetables,...) and green waste (leaves, branches, flowers and scrap); 32,18 % of thin sand; 8,31 % of plastic matters; 4% of cardboards and papers; 1,58% of metals; 1,11% of textiles and remnants of moss; 1,01% of glasses; 0,79% of shoes and leathers; 0,63% of shells, shells, crabs and pearls; 0,13% of engraved and of pieces of bricks; 0,7% of dead batteries. This high proportion of biodegradable materials is an asset for the development of such waste.

## ***B. HOUSEHOLD WASTE MANAGEMENT STRATEGIES IN THE CITY OF POBÈ***

### **3.2.1. Household waste management methods**

The elimination of household waste is so varied in the city of Pobè. A portion of the waste is discharged directly in nature, while the other part is used by people to backfill the shallows or buried or incinerated.

Field results showed that burning, landfills and garbage are the main garbage management methods adopted by 46.06%, respectively by 32.12% and 21.82% of them investigated. Outside of these management methods, it is necessary to signal that in the city of Pobè, anarchic deposits on empty spaces behind the houses still observe. Besides this, 60% of surveyed people still defecate around houses. These choices are justified by the existence of illegal landfills in the middle and the absence of mechanisms to force households to meet the standards of environmental protection. Indeed, article 7 of law n° 87-015 of 21 September 1987 on the public health code stipulates that in urban areas, household waste to be deposited in landfills or in sealed metal or plastic containers enclosed, easy to handle. In the study area, the garbage is placed in boxes, baskets, etc. contrary to the provisions of the code [4].

In rural areas, article 9 the same law specifies that it can be carried to burial or incineration of garbage in a landscaped area and located more than 200 m behind the last houses and more than 50 m from point water [4]. Furthermore, it may also process the digging of a pit of 3 to 4 m in depth up against a talus and away from at least 200 m of the last houses. In the study area, the pits are made on a flat surface lightly with 2-3 m deep and are mostly located within 10-20 meters of housing. These findings raise the question of compliance with laws governing the protection of the environment in Benin.

The decomposition of this waste is harmful to humans and to the environment despite the pre-collection system in place.

### **3.2.2. Pre-waste collection system in the city of analysis Pobè**

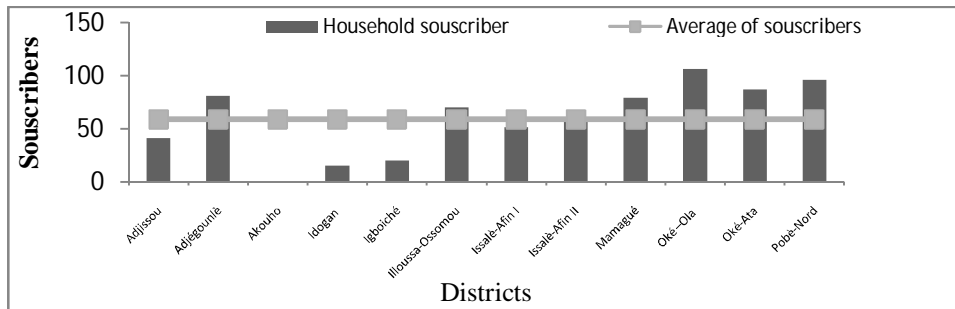
The insufficiencies of the management of household waste in the city of Pobè essentially relate to the weakness of the removal capacity of these structures by the waste collection and bad practices of the population. In the city of Pobè, household waste is collected by the NGO APESaB. She faces its services profitability difficulties. This reflects the number of subscribers which is low while the amount of waste is very high. To this must be added the unwillingness of the subscribers to pay 1000 CFA per month for garbage removal from their surroundings. People prefer to throw their garbage on a wild dump not far from their places of residence. In fact, the recovery rate delivery charge is 61%. These findings limit the interventions of the waste collection NGOs. In addition, field investigations revealed that 11 out of 12 districts are covered by the NGO APESaB (fig.4).

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**Fig. 4:** Distribution of households subscribing to collect waste in the city of Pobè in 2013

The fig.4 shows that Adjégounlè neighborhoods Illoussa-Ossomou, Mamague, Oke-Ola, Oke-Ata and Pobè North are most covered by the NGO APESaB. The Adjissou neighborhoods Idogan, Igboiché, Issalè-To-order Issalè I and II are the least covered. The Akouho area is not covered by the NGO because of its semi-rural character, its distance from the urban center (about 3 km) and its difficult access to carters. A total of 8.785 households in the city of Pobè, only 08 % (or 703 households) have subscribed to the collection of waste. This low rate is also explained by the deterioration of the access routes to housing, the low involvement of the mayor and the non-application of law n°. 87-015 of 21 September 1987 on the public health code which regulates waste management in the Republic of Benin. The waste thus pre-collected in the city of Pobè is deposited at sites in North and Pobè Ossomou (images 1 and 2) to be burned.



**Image 1:** Partial view of North Pobè site for the dumping of wastes



**Image 2:** Partial view of the site acquired by the NGO APESaB for discharge of waste Ossomou (Pobè)

The images 1 and 2 respectively show the pre-waste collection sites Pobè North and Ossomou in the city of Pobè. The site of photo 1 was temporarily made available to the NGO APESaB by CRA-PP (Agricultural Research Center in Perennial Plants). For two years, the NGO has acquired a land of 1 hectare (image 2) where the waste collected is dumped to be burned. Despite the increase in waste, the municipality has not generated a waste discharge and treatment in spite of the economic value of waste and environmental consequences that could generate the non-recovery. The waste then disintegrates under the combined effect of temperature and rain. Similarly, the waste remnants are drained along the slope to infiltrate into the soil and pollute water resources of the city. Unlike the city of Pobè, the municipality of Ouidah is involved in the problem of waste management in the city. Indeed, Odoulami et al. [7] showed that at Ouidah, recycling strategies and recovery of waste are developed. However, revitalization, extension and application of texts on hygiene and sanitation by the municipal authorities are essential and necessary for the cleanliness of the city.

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## ***C. DIAGNOSIS OF HOUSEHOLD WASTE MANAGEMENT IN THE CITY OF POBÈ***

Diagnosis of waste management has helped identify a minimum of institutional and legal framework exists to better organize and promote environmentally sound management of wastes acceptable manner and prevent health risks related to socio mismanagement of the sector. However, some malfunctions are noteworthy.

Thus, at the institutional level, malfunctions are observed, both at structural, organizational and strategic. Among the structural dysfunctions, there is confusion in the exercise of skill levels dedicated by law to government departments and local authorities. Since 2003 when decentralization has become a reality in Benin, the ministry responsible for the environment still holds the service of the environmental police and the ministry in charge of health, animal health service without of any formal agreement between them and the town councils on the use of these services.

At the level of central and local administration, waste management is moreover a basic service, proximity, suffers at the forefront of institutional failure. Among the strategic and managerial malfunctions, the ministry responsible for the environment has to date no integrated coordination plan and support for waste management in Benin. Despite the existence of strategy documents on waste management, technical departments of the ministries do not have support plans for the implementation of these strategies. This results in confusion in the allocation and the actual exercise of competence and negatively affects the achievement of satisfactory results in the sector. In addition, the technical structures of the ministries are constrained to their administrative role than their technical role and operational support.

At the legislative level, shortcomings are of lesser magnitude and are manifested mainly by non-compliance or non-application of legal texts. The real problem may be reduced to a very low level of institutionalization, extension, monitoring and repression on the application of laws. Laws are made and kept, mostly at the level of central authorities, and under the pretext that "no one is supposed to ignore the law," then it actually is ignored populations. In the current context of extreme politicization of all sectors of economic and social life, the government will spend for the guardians of legislation and not guarantee their application. Sometimes, the institutions themselves are the first to show the example against law enforcement. This sad reality at the highest level is despite the clear provisions of certain decrees on environmental protection. Hardware, technical and organizational failures are noted at both producers and other key stakeholders in the system.

At the population level, environmental awareness regarding individual responsibility and collective environmental preservation is not yet rooted inhabits. Ignorance of texts and their daily violation are notoriously identified and are reinforced by the near non-existence or non-application of repressive measures. Also, the source separation, ultimately, should the primary separation of biodegradable waste and non-biodegradable already know at least an implementation start, given that it is a requirement established by texts. Educational programs and measures communication for behavior change were unsuccessful. In terms of formal pre-collectors such as NGOs, we note that for most, this is structures took advantage of the vacuum created by the absence of public services to install. The main organizers are in search of gainful employment. Thus, the main goal is not necessarily preservation and sanitation of the living, but simply looking for a minimal gain for survival. It follows mostly the almost total lack of technical and research the development and professionalization. These NGOs mostly do not have in their management, accounting tools or instruments for monitoring and practice improvement plans in this area.

At the level of local authorities, it is easy to realize that these are most often the permanent quest for funding is outside of central government is to replicate the same experience of major cities, including constructing landfills, collection points equipped, buying carts and other equipment to be made available to NGOs pre-collection. In addition, technical staff is available to councils for the most unskilled. Waste management also knows the problems regarding its financing. Local councils do not have the means to invest in waste management infrastructure and do not have enough resources to cover recurrent costs. In addition, the harmonious development of the sector requires a support fund for the waste sector investments, which is lacking at the

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moment. Currently, a multitude of collectors selects parts of the waste they will sell, leaving the others that do not interest them. This is a loss for the sector as a whole.

However, the waste sector has important assets that should be based development. These assets are:

- a clear will on the part of the competent authorities, both at national and municipal levels, in the short term to resolve the problems posed by the lack of structured waste management systems ;
- dynamism and expertise of NGOs and stakeholders from the informal sector in waste recycling ;
- a significant participation of households in financing the pre-collection service;
- households and businesses willing to contribute a little more for improved waste management.

## ***D. MEASURES OF SUSTAINABLE HOUSEHOLD WASTE MANAGEMENT IN THE CITY OF POBÈ***

Facing the increasing unhealthiness prevailing in the city of Pobè and in terms of health risks, it is urgent to take corrective measures for better management of the environment. For this purpose, it is to suggest that the State and the local authorities develop implementation strategies for the sanitation program developed by municipal authorities Pobè. It is necessary to motivate the creation of waste collection structures that are non-existent in the city; define landfills and waste treatment areas; organize information sessions, education and communication on hygiene and sanitation of the living environment in the city; finance and develop enforcement policies of the municipal program; conduct outreach and application of existing legislation on hygiene and sanitation in force in Benin. These articles 2, 3, 4 and 6 of Benin hygiene code which prohibits the deposit or discharge of garbage, sewage in the streets, on highways, ... or burial of remains animals and garbage on highways, etc. for the preservation of water resources, environment in general and in particular the health of the urban population Pobè.

Also, domestic wastes, wastes and others trading, human excreta and animals ... may be mixed for be a source of the usable energy in all of Benin households like that is already done in some households in Commune of Abomey-Calavi, Savalou, ....

## **IV. CONCLUSION**

This survey diagnosed the present fashions of management of the domestic garbage in the city of Pobè. The gotten results showed that the main fashions of management of the domestic garbage contribute to the deterioration of the environment through the heaps of constituted litters to 49,56% of biodegradable matters (plant, kitchen garbage, etc.) that strew the streets, the façade of the dwellings,....

An institutional and legal device minimum exists to organize better and to promote a management ecologically rational of the garbage. However, some dysfunctions exist and deserve to be corrected. This study diagnosed the current modes of household waste management in the city of Pobè. The gotten results showed that the main municipal waste management methods contribute to the degradation of the environment through the dunghill constituted to 49.56 % biodegradable material ( vegetable waste , cooking , etc.) littering the streets, the front of the houses .... There is a minimum of institutional and legal framework to better organize and promote environmentally sound waste management. However, some shortcomings exist and should be corrected.

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ISSN(Online) : 2319-8753  
ISSN (Print) : 2347-6710

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