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MANAGEMENT OF AGRO-FOOD PROCESSING WASTE IN THE DISTRICTS OF AKASSATO AND GOLO-DJIGBÉ IN SOUTHERN BENIN

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ABSTRACT

The districts of Akassato and Golo-Djigbé of the municipality of Abomey-Calavi are exposed to waste management problems that have an impact on the environment and on the health of the population. The purpose of this study is to analyze the management methods of agro-food processing waste and the measures to be taken. The methodological approach adopted is based on investigations in the real world through interviews and direct observations. Thus 135 people were questioned according to a reasoned choice. Socio-anthropological, demographic and socio-economic data were processed and the results were analyzed with the PEIR model.

The results obtained reveal that 42% of the surveyed households engage in the processing of cassava into gari, 30% of corn into akassa, boule d'akassa, 20% of soybeans into cheese and 8% of pineapple into juice. pineapple. No adequate management system for agro-food processing waste has been put in place. Thus 55% of the households surveyed do not know the ERE, while 45% are aware of it. So we need the practice of valorisation for an efficient management of waste in these districts.

Keywords: Management, Agro-food Processing Waste, Environment, Akassato, Golo-djigbé.

1. INTRODUCTION

Most African states, especially south of the Sahara, have experienced very intense urbanization over the past thirty years. Benin is no exception to this situation, where the population growth rate is on average 3.2% per year. One of the consequences of such a situation is the increase in the generation of household solid waste and wastewater (DJOI S. 2017, p 42).

In addition, the collection and treatment of household solid waste is almost non-existent, which indicates the weaknesses of the municipality's sanitation policy. In the same vein, Adbaye Beal Pureté (2000, p. 20) argues that in most Third World countries, municipal authorities have not been able to provide basic sanitation to the population. Poor management of household solid waste causes huge environmental and sanitation problems within the municipality (DOSSOU-YOVO, 2013, p. 6)

For a healthy and sustainable management of the environment, it is therefore necessary to identify the types of agri-food processing waste produced in the districts of Akassato and Golo-Djigbé and their management methods. An in-depth study must be carried out in order to propose measures to improve waste management methods from agri-food processing. The municipality of

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Abomey-Calavi is located between the parallels of 6°20' and 6°41' north latitude and the meridians 2°12' and 2°25' east longitude (Figure 1).

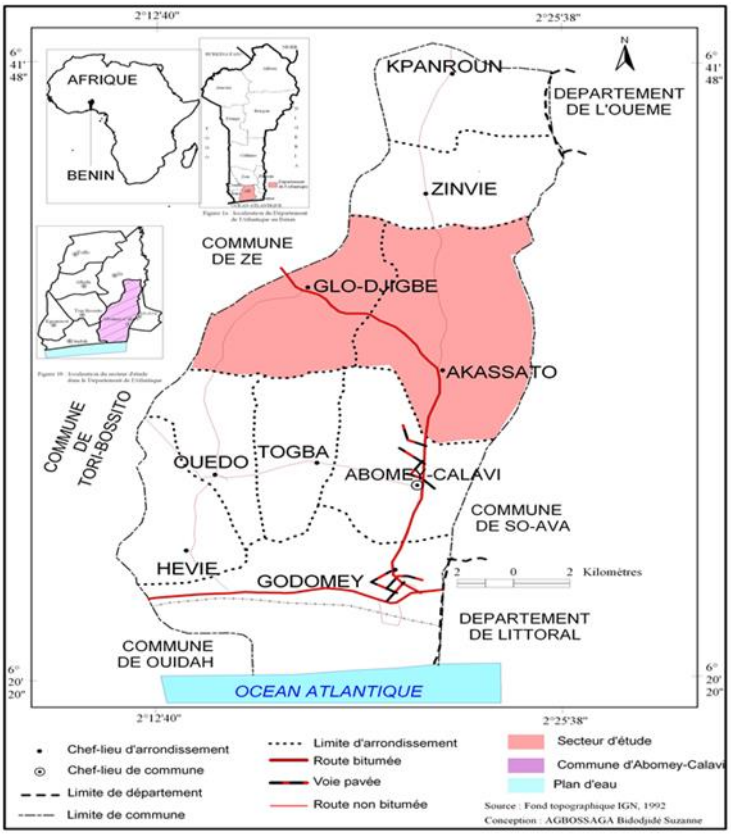

Figure 1: Geographical location of Glo-Djigbé and Akassato (municipality of Abomey-Calavi)

2. METHODOLOGICAL APPROACH

The methodological approach adopted concerns data collection, data processing and analysis of results

2.1 Data Collection

The data is both quantitative and qualitative, it involves:

- quantitative data on the production of agri-food processing waste at the level of collection companies or NGOs in order to determine the parameters.
- qualitative data such as the opinions of the authorities in charge of waste management to know the advantages of the DTA production and management sector;
- climatological data obtained at ASECNA over the period 1980-2020;
- demographic data for the years 1992 to 2030, they are obtained at INSAE and have made it possible to analyse demographic pressure and its influence on the production of DTAs.

2.1.1 Data Collection Techniques and Tools

Several techniques and tools were used to collect the data.

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- Direct and intermediary interviews, which made it possible to collect additional data from the structures;
- Direct observation in the field, which made it possible to assess the environmental state of the study area;
- Target questionnaire that provided more information on the subject and the targets' behaviour towards the environment.

The tools that are used include:

- Map of the study area that made it possible to locate the target districts;
- Questionnaire that provided more information on the subject and the targets' behaviour towards the environment;
- Observation grid, which consisted of apprehending the realities of the field in relation to the environment and waste;

A digital camera for shooting indicative elements.

2.1.2. Sampling

The choice of boroughs and neighbourhoods in which the research was conducted was made based on the abundance of agri-food processing activities. They are identified in the 2013 RGPH 4 consultation. As for the interviewees, the target is made up of men and women, heads of households (households in which at least one agri-food processing takes place; households with unprotected wells for drinking water and which use nature as a place to dispose of garbage). The respondent is at least thirty years old (30 years old) and actually residing in the study environment. A total of 135 households were surveyed, following a reasoned choice, including businesses and women's associations involved in the processing of agri-food products. The methodological approach adopted led to the following results.

3. RESULTS AND DISCUSSION

2.1. Monthly thermal and rainfall patterns

The Commune of Abomey-Calavi is located in the sub-equatorial or Beninian climate characterized by two rainy seasons and two dry seasons and by a temperature between 24 and 31 °C (Figure 2).

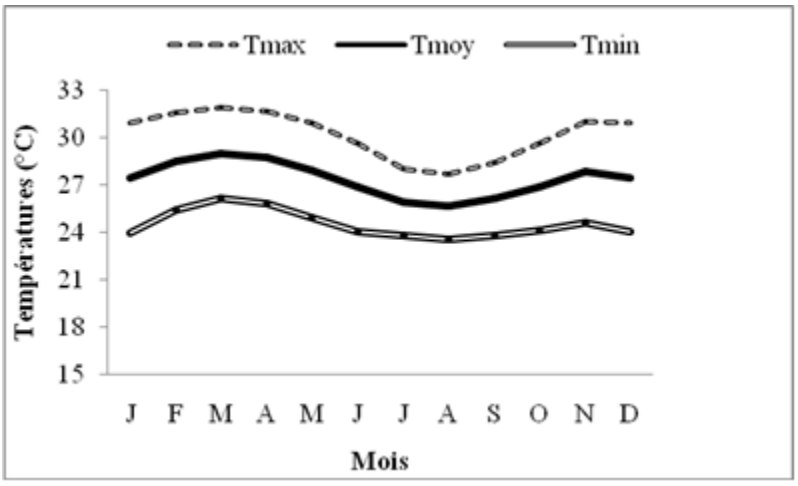

Figure 2: Inter-monthly evolution of average temperatures in Abomey-Calavi

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The observation of the figure shows that the commune is located in an area of permanent heat and humidity. Better still, this mixture of garbage, excreta and water contaminates the soil during rainy periods through infiltration (Dansou, 2011). The relatively low annual temperature range is 3.8°C (ASECNA 2020). The hottest months are February, March and April with a maximum temperature of 31 °C while the coolest months are July and August with a minimum temperature of 24 °C

In addition, the average annual rainfall was around 1131.2 mm over the period 1980-2010 (Figure 3).

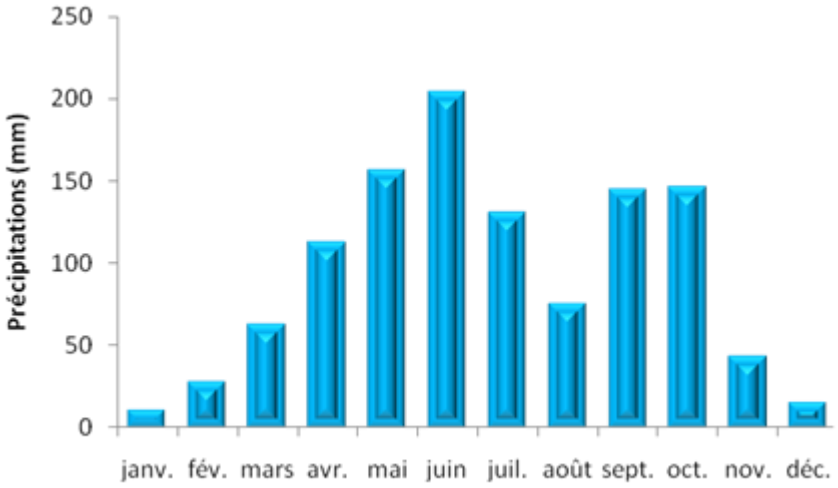

Figure 3: Average annual rainfall in the Municipality of Abomey-Calavi

The analysis of the figure shows that rainfall is a determining factor in the management of agri-food processing waste (ATW). Indeed, on landfills, DTAs are exposed to rain and after some time, give off foul odors.

It shows from these analyses that DTAs are poorly managed in the study area.

3.2. Management of agri-food processing waste

During the research, it was found that the agri-food processing waste identified all belonged to the type of biodegradable waste: it is the waste that decomposes easily. These are food residues, animal and plant organic matter. This waste comes from the processing of agri-food products.

The different agri-food transformations in the study area are:

- ✓ Processing cassava into Gari
- ✓ The transformation of maize into Akassa (commonly known as Lio)
- ✓ Turning pineapple into pineapple juice
- ✓ The transformation of soybeans into cheese commonly known as Amun-soybeans

3.2.1. Processing cassava into Gari

In the processing of cassava into gari, we have two kinds of waste: liquid and solid waste

2.2.1.1. Solid waste

Solid waste is waste that has a relatively firm consistency as opposed to fluid and liquid. It is the waste that contains more organic matter. At this level, cassava peelings are the solid waste. They

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are exposed to the sun (plate 1) while waiting to find the farmers of pigs, oxen, sheep and others to whom they can deliver them to feed their animals.

In the event that people cannot find herders, they are forced to dump them on the uninhabited spaces next to the houses.

Plate 1 : Cassava peeling spread out on the courtyard of a house waiting for herders

Shooting : AGBOSSAGA, May 2021

3.2.1.2. Liquid waste

This liquid that escapes from the cassava puree floods the pressure area and flows with difficulty (Plate 2)

Plate 2 : Liquid waste from the processing of cassava into flowing gari in different designs

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Shooting : AGBOSSAGA, 2021

Plate 2 below shows the liquid waste that comes out of the cassava puree at the cassava puree. This liquid is nothing more than starch and water contained in the cassava tuber. It is left in the open air and can dry out in the sun. It should be noted that the solid waste (peelings) or liquid waste (water + starch) that comes out of the processing of cassava into gari makes the yards unhealthy and gives off foul odours under the effect of heat or rain. These smells pollute the environment and make the surrounding population uncomfortable. Others also spread cassava peelings in the fields. These break down and become fertilizer for organic farming.

3.2.2. Transformation of maize into Akassa, Akassa ball (Lio) into Porridge

3.2.2.1. Solid waste

Just like the cassava peeling, the bran of maize is spread on the courtyard of the houses to be dried in the sun while waiting for the pig farmers to come and get these bran to feed their pigs, in case the good ladies cannot find anyone to sell their bran, they throw them on the garbage heaps located next to the houses. These sounds thrown on the garbage heaps give off the foul smells (Photo 1).

Photo 1: The bran from the transformation of maize into an akassa ball

Shooting: AGBOSSAGA, May 2021

Photo 1 above shows the bran of the corn. In fact, after filtering the corn paste brought back from the mill after having soaked it in water at (eighty degrees) we obtain, the bran, the starch and the water that was used for the filtering. The bran obtained is the solid waste while the fermented water obtained after the starch has been deposited at the bottom is the liquid waste left behind a few hours later.

3.2.2.2. Liquid waste

Liquid waste is waste with a low consistency, most of which is water.

The liquid waste that is fermented water is poured onto the garbage piles. Nevertheless, some lady juice sellers source this water to prepare their juice, commonly known as Adoyo. For others, taking this water regularly allows them to urinate well (and therefore to be healthy). Others use it to make herbal tea to drink in order to be healthy.

It should be noted that with regard to the transformation of cassava into Gari, the only company Social Economy Initiative (SEI) MASSAVO of GOLO CENTRE, which is a company made up

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of women processors of cassava in Gari, has installed devices and infrastructure for waste management (Plate 3).

Plate 3: Partial view of waste management devices and infrastructure

3.2.3. The processing of soya into cheese commonly known as 'amon sodja'

At this level, the soybeans after being soaked in water are ground. The resulting paste has two products: filtrate, the starch that is used to prepare the cheese, and the bran, which is solid waste. The bran spread on the courtyard is dried and sold to the pig's farmers (photo 2).

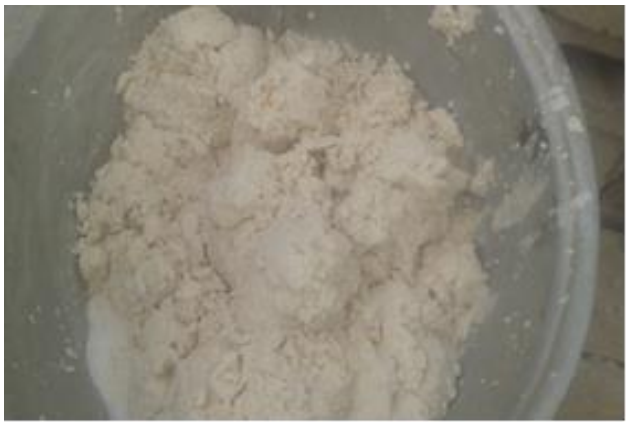

Photo 2 : Soybean bran in a basin waiting for farmers
Shooting: AGBOSSAGA, May 2021

Photo 2 shows the sound of soybeans in a basin waiting for farmers. This sound, which is waste, will be used as animal feed. It will be sold to breeders.

Liquid waste from the processing of soybeans into cheese is dumped on the yards of houses and on garbage heaps (photo 3).

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Photo 3: Liquid waste from soy-to-cheese processing
Shooting: AGBOSSAGA, May 2021
Photo 3 shows liquid waste used to feed pigs. Otherwise, they are thrown on the garbage heaps next to the smelly houses.

2.2.4 Turning pineapple into pineapple juice

At this level, three types of solid waste can be obtained according to each company's procedure: Peeling pineapple; the bran obtained after the extraction of pineapple juice and the bran obtained from the crushed pineapple directly.
At this level, some companies, instead of going through the peeling of the pineapple, they grind them directly without peeling them (Plate 4).

Plate 4: Pineapple bran
Shooting: AGBOSSAGA, May 2021

The analysis in Plate 4 shows the pineapple bran obtained by some pineapple juice processing companies. This sound is not peeled, it is directly crushed. Just like the previous solid waste management, pineapple solid waste is used to feed pigs, oxen.
For liquid waste management, the water that has been used for pineapple management is poured onto garbage piles in companies that do not have the financial means to build catch basins. And for those that do, the water is drained to the catch basins.

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CONCLUSION

The present research on the management of agri-food processing waste in the districts of Akassato and Golo-Djigbé has made it possible to touch on the reality of the management of agri-food processing waste. Most of this waste is used as animal feed. In these boroughs, modern agri-food processing waste management practices are virtually non-existent. As a result, most populations engage in traditional agri-food processing waste management practices, which are an excellent source of environmental pollution. However, it should be noted that there has been a beginning of modern management of liquid waste resulting from the transformation of cassava into gari, as in the case of the IES MASSAVO association in Golo-centre.

It is then the responsibility of municipal authorities to take appropriate measures and put in place policies for the management of agri-food processing waste. Emphasis should also be placed on environmental education efforts and the practice of composting for the sustainable management of this waste, because a prosperous and well-sanitized city is a tourist expectation for any country that attracts investors and development partners.

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