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Burden thoughts of Managing Solid Waste in Efoulan

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Abstract: Efoulan, a head quarter of the Yaoundé 3 council, has been languishing under the weight of solid waste for nearly three years. The issues are characterized by the importance and value of the actions taken in solid waste management. The challenges are determined by challenges to overcome and opportunities to seize. Semi-qualitative surveys conducted with stakeholders, including households, municipal authorities, pre-collectors, and sorters, revealed social, institutional, economic, financial, and technological constraints related to solid waste management issues in Efoulan, as well as related challenges aimed at curbing crises.

Keywords: *Efoulan, Solid Waste, Issues, Challenges, Semi-Qualitative Surveys.*

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I. INTRODUCTION

Since 1994, household waste disposal problems have emerged in the city of Yaoundé. For over a year, the city of Yaoundé has been overwhelmed by the expansion of solid waste. This is residue that is neither liquid nor gaseous and is generated by human activities. It comes from various sources, namely: households (food waste, packaging, paper, cardboard, etc.), industries (production, manufacturing, construction waste, etc.), businesses (packaging waste, food products, etc.) and institutions (office, school, hospital waste, etc.). It is commonly known that efficient waste management is important to protect the environment and public health. It is becoming practically difficult to move around the city of Yaoundé without encountering waste lying around on the side of the roads, in waterways and in gutters. Waste disposal and collection is a recurring concern. Waste management, in our context refers to as any activity concerning the organization of waste management from its production to its final treatment. It includes, in particular, the activities of collecting, transport, trading, brokerage, and treatment, recovery or disposal of waste. It is clearly recognizable that the issue of solid waste management is not a new field because many paths have been beaten in this regard. Many authors have certainly mentioned environmental phenomena in southern countries related to waste management likely to generate short- or long-term nuisances due to their non-biodegradability in their research work (Thonart and Diabaté, 2005), as well as health risks in Cameroon due to uncontrolled and illegal dumping (Monebene, 2024). Beyond these nuisances, it is clear that the institutional aspect, for example, is crucial to establish an effective and sustainable waste management. The study of the issues and challenges to be addressed fills this gap. The purpose of our study is to explore the issues and challenges of managing waste in the capital of the Yaoundé 3 municipality, particularly in Efoulan, and to be able to extrapolate or generalize from this to the city of Yaoundé, and even throughout Cameroon. Cameroon's political capital is characterized by an exponential expansion of solid waste disposal spots. The pervasiveness of the solid waste management problem is rooted in an institutional context, among others. The goal is to analyse the issues and challenges that pervade waste management in Efoulan. Issues in this context refer to the importance and value of actions taken in solid waste management. Challenges are determined by issues to overcome and opportunities to seize. This examination focuses on two main questions:

- What are the burdens associated with solid waste management issues in Efoulan?
- What are the challenges to overcome the burdens of solid waste management in Efoulan?

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II. METHODOLOGY

➢ *The Study Area is Efoulan, Capital of the Yaounde 3 Municipality.*

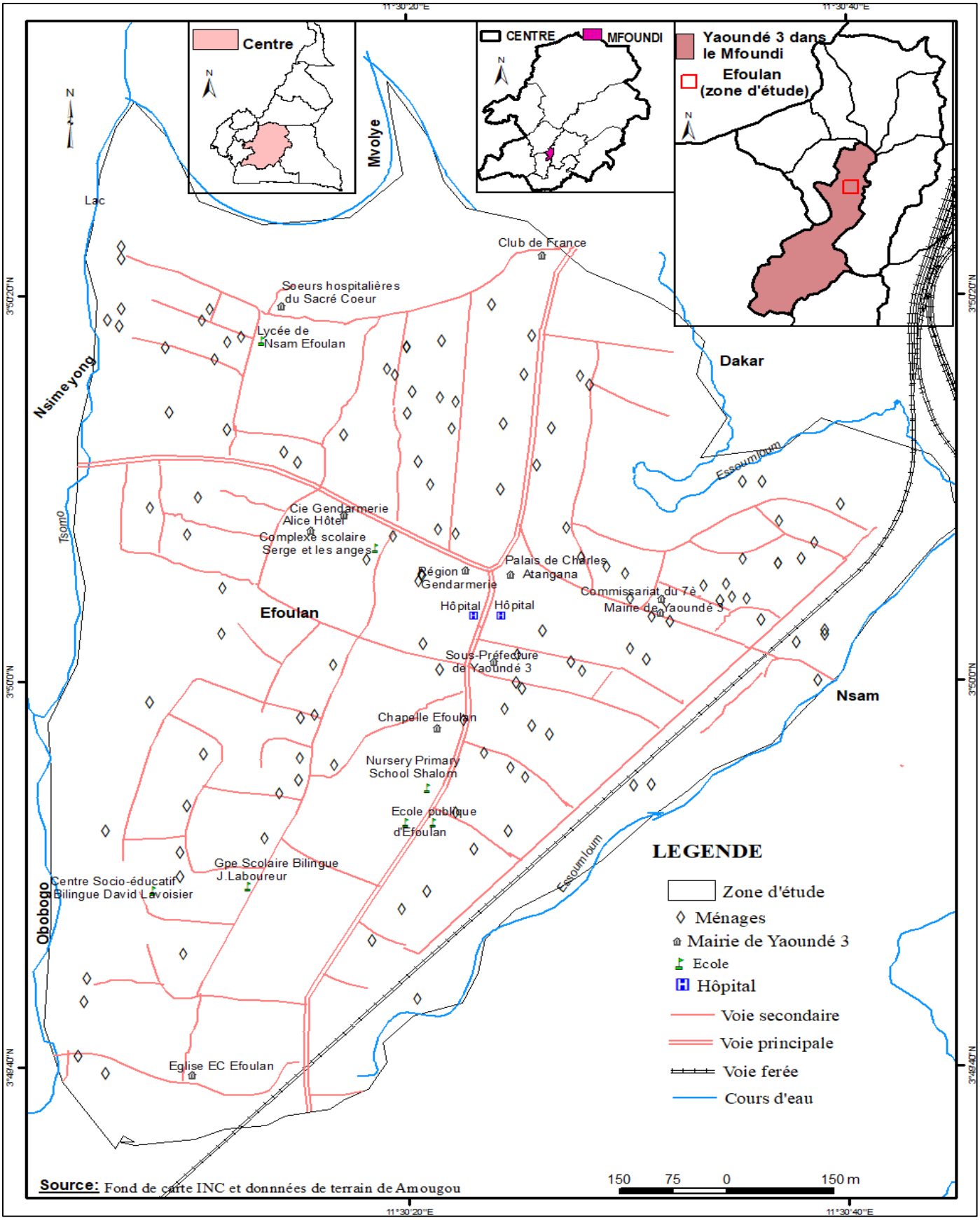

Fig 1 Location of the Study Area

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Data for this paper was obtained from quantitative, qualitative data survey and fields observations. The field surveys were undertaken from december 2024 to march 2025.

The Efoulan is located in the northeast of the Yaounde 3 municipality. Our research is semi-qualitative. The survey was conducted among various stakeholders. Eventhough the number of households estimated by the third census of central bureau of the census and population studies was about 5899 (Amougou, 2020), the study was conducted on a direct survey with representatives of 120 households aged at least 15 years in the Efoulan area to obtain information on their household waste disposal methods and the length of time they have lived in the area. For stratified sampling, the households' choice was divided into six sections according to the different topographical locations of their compounds (Table 1), focused on those who were volunteers to answer our questions.

Table 1 Survey Sample Composition

Topographic Spots	Households
Flat land	13
Drained low land	6
Interfluve high spot	1
Marshy lowland	4
Slightly sloping land	73
Steeply sloping land	23
Total	120

Source: Field Work, 2025.

Direct interviews were also conducted with pre-collectors, sorting operators, and administrative authorities of the decentralized local authority. Households were geolocated using a GPS (Global Positioning System). We used ASTER 2007 and Google Earth satellite images, images of the housing of the Yaoundé Urban Council, and the 1:10,000 Yaoundé master plan from the National Cartographic Institute (INC) to create the base maps and thematic maps for our study. These tools were supplemented by field observations. We also analyzed and processed geospatial data from households and garbage collecting points using ArcGIS 10.8 GIS software to present them in visual form (maps). SPSS 25 was used to analyze the relationship between household settlement duration and the area of their plots using cross-tabulations. Household descriptive statistics were analyzed using Word and Excel. Observations were snapped with a standard Android phone and a GPS camera application.

III. RESULTS AND DISCUSSION

- *Burdens Associated to Solid Waste Management issues in Efoulan*

Burdens are factors that hinder or impede the sanitation of the Efoulan area. In the issues of solid waste management, these burdens can be institutional, economic, social, environmental, or technological.

Social burdens affect the populations of the Efoulan area, particularly households, which are the main producers of solid waste. It is a fairly heterogeneous population from the point of view of the region of geographical origin (figure 2), but with a strong dominance of the center.

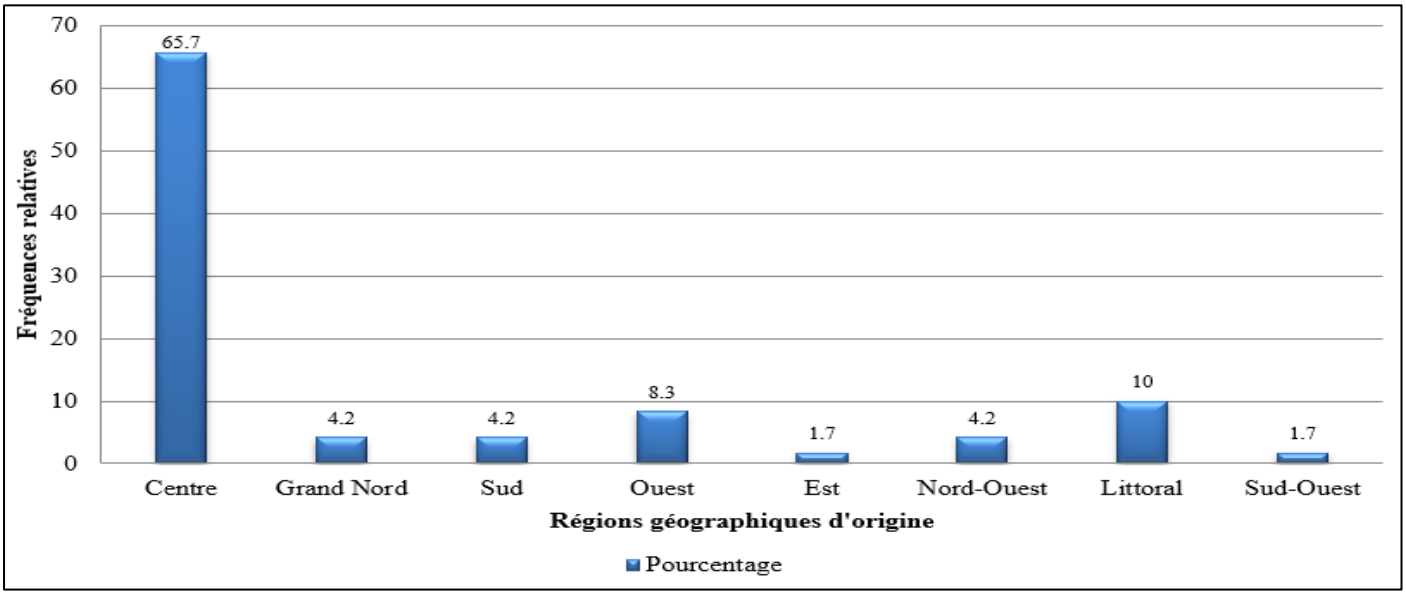

Fig 2 Distribution of Households by Geographic Region of Origin
Source : Field Work, 2025

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The settlement of the households surveyed shows that these are indeed well-established households in view of the surface area occupied by their settlements (Table 2). Table 2. Cross-tabulation of duration of settlement and surface area of household compounds

Table 2 Duration of Settlement Surface Area in m2

Duration of settlement	Surface area in square meter (m^2)				
	Less than 200	200-499	500-1000	More than 1000	Total
Less than 5years	3	17	5	2	27
5 to 9	2	12	1	0	15
10 to 14	0	4	0	0	4
15 to 19	1	6	3	0	10
20 to 24	1	11	2	0	14
25 to 29	1	5	0	1	7
30 and over	0	11	6	0	17
Native	0	11	10	5	26
Total	8	77	27	8	120

Source: Field Work, 2025.

The table above shows that the majority of households are made up of natives this is indigenous people. The behavior of households living in an environment that is not always healthy does not suggest a collective awareness of how to improve it for their well-being and demonstrates a lack of environmental awareness. Indeed, even when there were garbage bins in the area, some households simply dumped their garbage along the edges, in waterways, in the bush, and sometimes engaged in non-selective incineration (Amougou, 2020). The absence of bins for the past four years has led the majority of households to dispose of their waste at the roadside, up to 80% (Figure 3 and Photo 1). 2.5% dump waste in waterways, which are supposed to be ecologically protected areas like marshlands, and 0.8% engage in non selective incineration.

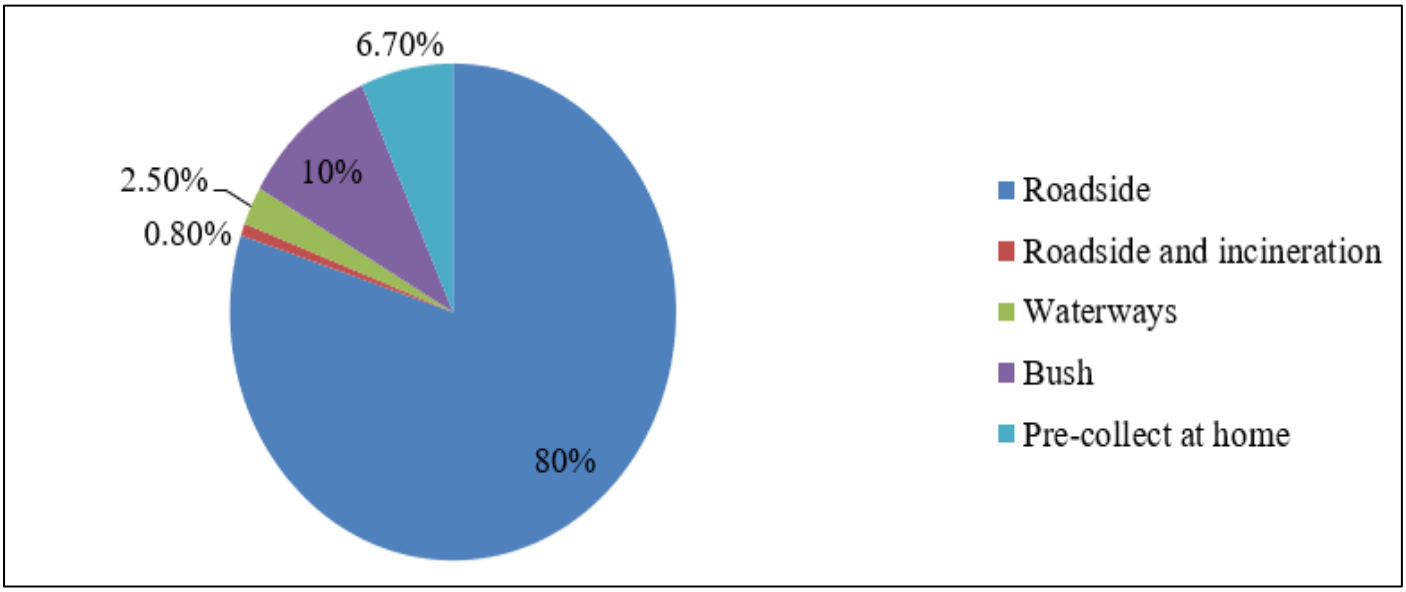

Fig 3 Household Solid Waste Disposal Method
Source : Field Work, 2025

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Photo 1 Solid waste dump with an erosion niche to the left, along the road located 200 m from Efoulan hall council, Amougou, March 15, 2025.

According to the figure above, only 6.70% of households participate in the home pre-collecting process carried out by agents of the private company Tychlof, for a monthly fee starting at a minimum of 2000 CFA francs, with the rate potentially higher depending on the volume of waste (Photo 2). This is due to households' strong resistance to changing waste management methods.

Photo 2. Tychlof employee working in the Efoulan area with his tricycle already loaded with waste pre-collected from a few households, Amougou, February 12, 2025

There are multiple solid waste dumpsites in the Efoulan area (Figure 4). At least twenty dumpsites have been identified, with a strong concentration in the eastern part of the area. Distances between bins vary from approximately 75 m to 500 m while distances between households and bins vary from 13m to 16 m.

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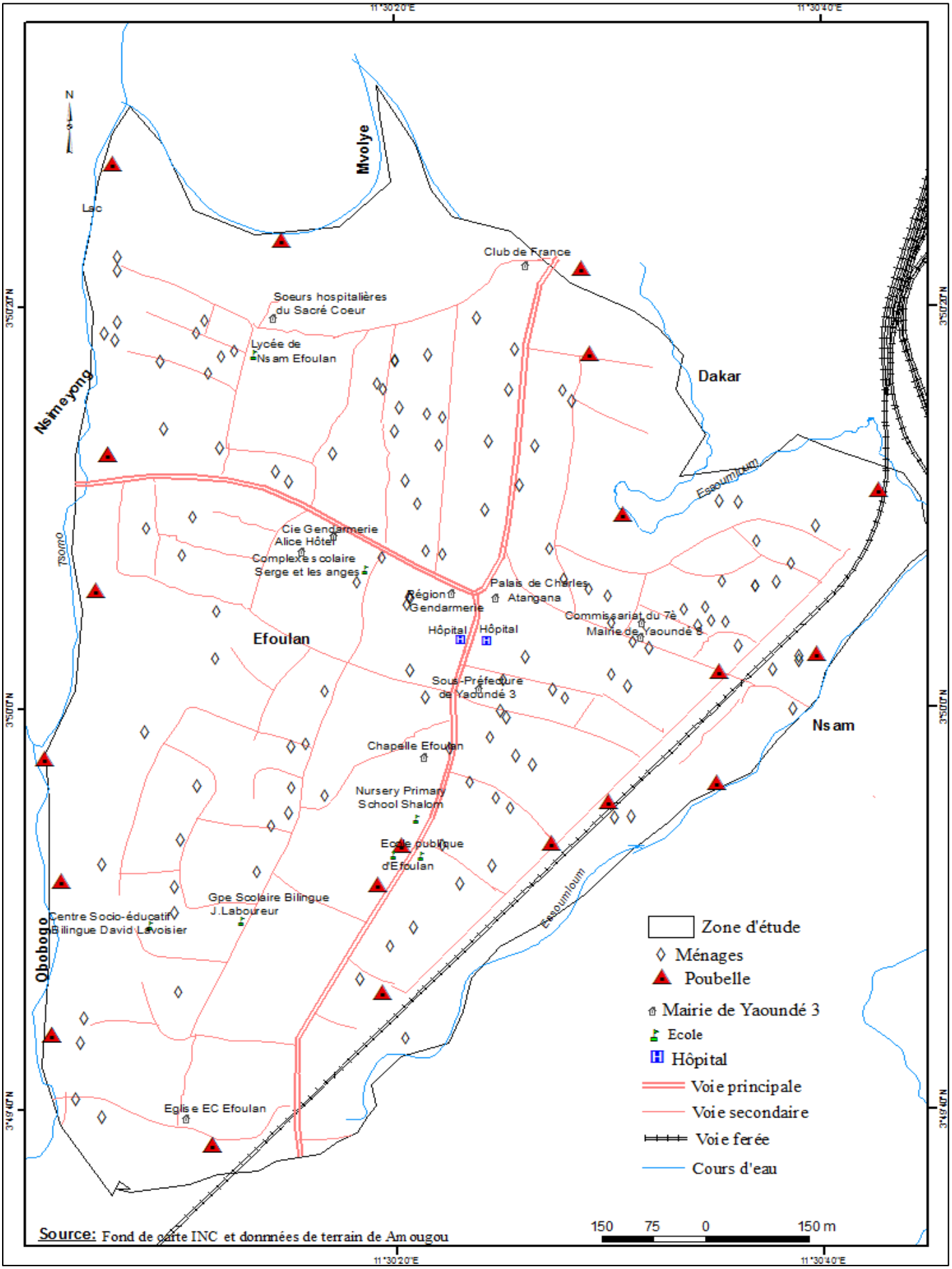

Fig 4 Spatial Distribution of Bins in Efoulan in 2025

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And yet, if the majority of households had adopted the pre-collecting solution mentioned above, there would be very little or no waste lying around in the streets. Indeed, waste pre-collected at roadside bin spots is directly unloaded at a first point located in the Nsam area (photo 3), from where it is then transported to another area in Nkolfoulou, 13 kilometers away. However, it should be noticed that roadside pre-collectings do not have fixed days and, moreover, depend on the availability of equipment, which is quite insufficient since it is intended for use in several other areas in the municipality.

Photo 3 Large landfill site for the Tychlof service provider in Nsam. A Tychlof truck parked after unloading. Mounds of garbage are visible in the background, Amougou, 01/26/2025

On an institutional level, the solid waste management system suffers from an inadequate organization centered on a strong centralization of the Yaoundé city hall. Indeed, the Yaoundé urban council has authority over the entire territory of the city. The various municipalities are subject to it. Consequently, the powers of the subdivisions mayors in the management of municipalities appears quite limited. And yet, according to the orientations of the Cameroon government, the article 16 of law No. 2004/018 of July 22, 2004, establishing the rules applicable to municipalities relating to the environment and resource management, specifies that they have the right over the cleaning of municipal streets, paths, and public spaces, the fight against insalubrity, pollution, and nuisances, and the local management of household waste (MINEPED, 2012). The municipality of Efoulan has failed to develop and implement a genuine sanitation program for its capital and its entire subdivision. There is a lack of synergy between the urban council and the subdivision council. In addition, the Efoulan municipality finds itself stuck with a lack of available territorial space that could serve as a pre-collecting point or even a landfill within its territory, given that all spaces have been invaded due to the uncontrolled expansion of housing. Economically, institutions must have sufficient financial resources to manage solid waste. Indeed, the minimum annual cost to ensure effective waste management in Yaoundé amounts to 15 billion CFA francs. But the government spends rarely provide half of this. And yet, there is a special excise duty on imports intended to finance waste treatment or management. This levy, restructured by the Prime Minister in 2023, is centralized by FEICOM, which is responsible for redistributing the funds to local authorities. Nevertheless, the amounts collected remain insufficient to guarantee the sustainability of services. Furthermore, the new tax law, which abolishes withholding taxes in favor of direct online declarations, is hampering all the budgetary forecasts of decentralized local authorities intended to implement their projects to combat insalubrity. The city hall has been working with the main service provider for over a decade, namely HYSACAM (Hygiene and Sanitation of Cameroon), to ensure the collection of household waste. As part of its emergency international tender procedure launched in June 2024 for the recruitment of a service provider, HYSACAM won a contract worth more than 45 billion FCFA. The Yaounde 3 municipality is not part of this lot and, by extension, Efoulan neighborhood. Indeed, since 2023, the city council has chosen a second service provider, namely Tychlof Sarl. The latter has

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recruited many young people who also carry out local pre-collectings in households in the Efoulan area for fees starting at 2,000 CFA francs negotiated over the counter. Furthermore, the absence of partnership and collaboration initiatives between recycling companies and the municipality is a barrier to waste recovery solutions, even though this could represent added value for the economy. Only the brave embark on sorting operations. These days, it is very rare to see scrap metal lying around anywhere, as sorting operators specializing in the matter roam everywhere, even to people's homes, collecting it and reselling it to pre-collectors for as little as 150 CFA francs per kilogram. The sorting of consolidated plastic waste materials also resold at these permanent pre-collectors (photo 4) have also been observed. Apart from the sorters already mentioned, there is another category of sorting operators specializing in empty plastic bottles (photo 5). This last category gains 5,000 CFA francs for a large net sold to the two authorized collectors in Yaounde, namely Ecogreen Recycler and Namé Recycler. But despite this, bottles of this type continue to be found on every street corner due to the incivility of the population.

Photo 4 Weighing a Bag of Solid Waste from a Sorter at a Commercial Pre-collecting Spot in Efoulan, Amougou, Mars 4th 2025

Photo 5 On the left, a gutter filled with solid waste, surrounded by brush. On the right, in front of the houses, plastic bottles are grouped in two nets. Amougou, 04 march 17th, 2025

The lack of funding sources and sustainable payment mechanisms for solid waste management services often leads to interruptions in employee service. Indeed, pre-collecting and collecting agents often accumulate many months of unpaid salaries, leading to demotivation, which in turn leads to the expansion of waste into the local environment.

Another obstacle is the lack of technical capacity, particularly the lack of skills and knowledge to effectively manage waste. Indeed, households in the area, as well as those in the city of Yaoundé, still fail to grasp the importance of waste recovery. Otherwise, waste would not be lying around. Furthermore, the Tychlof company also uses inadequate heavy machinery, which causes human erosion through the constant digging of the soil to remove waste.

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➢ *Challenges to the Burden of Solid Waste Management in Efoulan*

To address these challenges, it is important to strengthen the institutions responsible for solid waste management, develop partnerships and collaborations, and implement effective monitoring and evaluation systems.

Among the challenges to be addressed is the implementation of Decree No. 2012/2809/PM of September 26, 2012, (MINEPED, 2012) establishing the conditions for the storage, sorting, collecting, transportation, recovery, recycling, treatment, and final disposal of household and similar waste, which stipulates:

➢ *« Article 4:*

- All household waste collection and storage activities shall be carried out by decentralized local authorities in conjunction with the relevant government departments.
- Decentralized local authorities shall, in conjunction with the relevant government departments, develop a municipal or inter-municipal household and similar waste management plan that defines the sorting, pre-collecting, collecting, transportation, landfill, treatment, recovery, and final disposal operations.

➢ *Article 5:*

- The municipal or inter-municipal plan shall take into account the guidelines of the National Waste Management Strategy. It shall define, in particular:

✓ The areas where municipalities or their groups are required to carry out sorting, collection, transportation, recovery, or final disposal operations for household and similar waste;
✓ The collection routes, frequency, and times for this waste;
✓ The waste collection procedures;
✓ The frequency of cleaning operations by area;
✓ The areas where the transportation and landfilling of this waste is the responsibility of its Generators.

- This plan is established for a period of five (5) years, renewable, and approved by Decision of the Minister responsible for the Environment.

➢ *Article 6:*

- Any holder of household and similar waste is required to comply with the Municipal or Intermunicipal Plan referred to in paragraph 2 of Article 4 above and to use the waste management system implemented by the municipalities and their groups or by the Operators.
- Decentralized local authorities or operators are required to cover the costs associated with sorting, collection, transportation, controlled landfilling, recovery, and final disposal of household and similar waste, as well as the costs of monitoring the cleanliness of areas where this service is provided directly by the generators of this waste. »

The State must promote the decentralization of funding to decentralized local authorities. The municipality must work to:

✓ Institutionalize a polluter-pays tax and create a new dynamic aimed at raising household awareness about waste recovery and the benefits to be gained.
✓ Create technological intelligence centers for transforming waste into added value.
✓ Coordination and cooperation between the various stakeholders involved, including those from traditional chiefdoms, which are grassroots communities.
✓ Use appropriate equipment for pre-collecting of waste on the ground to avoid potential risks of mass movements (landslides and rockfalls).

Implementing these proposals would ultimately help curb the solid waste crisis in Efoulan. These proposals are generalizable throughout the country.

IV. CONCLUSION

This study reveals that reluctance to change habits, institutional centralization, a lack of financial resources and sustainable payment mechanisms, and a lack of technical capacity represent the main burdens faced in the solid waste management in Efoulan. These issues and challenges are numerous and complex. The main challenges to be addressed involve the decentralization of management to local communities, which are effectively decentralized, and the development and implementation of innovative, binding measures for integrated sustainable management this is inclusive of producers, transporters, and recyclers, driven by a new dynamic. Future research could focus on recycling techniques with a view to popularizing solid waste recovery.

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