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Urban Governance and Sanitation in the Peri-Urban Commune of Agoè-Nyvé 6 in Togo: Diagnosis of the Sanitation System in Adétikopé

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Abstract: In African cities, the ever-increasing production of wastewater and excreta poses a major management problem. The aim of this study was to take stock of wastewater and excreta management in Adétikopé in the commune of Agoè-Nyivé 6. This was a cross-sectional, descriptive study of the knowledge, attitudes and practices of the population of the locality of Adétikopé in terms of wastewater and excreta management, which took place from August 2022 to July 2023. It involved 5256 households in 12 villages in the locality of Adétikopé and was carried out via a field survey, interviews, observations and documentary research. The results showed that 72.60% of respondents were women. The majority of households (85.62%) had latrines, 66.40% of which had never been emptied. The remainder used a mechanical emptying truck (5.48%). Households without latrines (14.38%) defecate with neighbors (14.28%) in the open (66.67%) and in public latrines (19.05%). The same applies to wastewater from cooking, washing and dishwashing, which is most often dumped on the public highway (78.77%). Wastewater is a breeding ground for mosquitoes that cause malaria, which is the most common disease in the area. The results of this study show that wastewater and excreta are managed by most concessions in an unhealthy way and discharged into the environment. It is important to step up public awareness campaigns on the harmful consequences of poor wastewater and excreta disposal.

Keywords: urban governance; sustainable development; wastewater management; Adétikopé; Togo

1. Introduction

Over the last two decades, the issue of waste management has become increasingly complex for both developed and resource-limited countries [1,2]. Developing countries are urbanizing very fast, and this urban growth is more rapid in Africa than on other

continents. Indeed, "African cities are growing at an unprecedented rate. Between 1950 and today, the proportion of Africans living in cities has risen from 14% to 40%, whereas it took Europe 110 years to achieve the same level of growth" [3]. Demographic growth, higher per capita incomes and greater economic activity have all led to an increase in the production of solid waste [4]. In African cities, the ever-increasing production of household refuse and other waste poses a major management problem in terms of collection and treatment [5]. With sanitation policies virtually non-existent or not yet a priority in some cities, it is not surprising to see the proliferation of stagnant water in certain neighborhoods. The absence of a sanitation master plan in these cities is not conducive to efficient, sustainable waste management [6]. Studies conducted around the world and in Africa show that the environment is unhealthy because wastewater, rainwater and solid waste are not properly treated [7]. As solutions, the results indicate that wastewater treatment enables sustainable resource management by improving the supply of drinking water and minimizing pressure on natural resources, energy recovery and agricultural support. Wastewater treatment offers one of the most sustainable approaches to water conservation, energy production and agricultural productivity [8].

In Togo, the results of the Unified Questionnaire of Basic Well-Being Indicators (QUIBB) survey carried out in 2011 showed that 70.80% and 21% of households dispose of wastewater in nature and in the street, respectively [9,10]. The increase in the volume of municipal wastewater poses serious problems in urban areas, as it threatens the quality of the environment, the health of the population, the image of the city and the living environment of the inhabitants. Wastewater management is becoming more than a major challenge that must be met because of the threat that wastewater poses to public health, the environment and socio-economic development [6].

Faced with this concern, the public authorities are advocating strategies ranging from an environmental protection law to the definition of a national health policy. The general legal framework for environmental management in Togo aims to: (1) preserve and sustainably manage the environment; (2) guarantee, for all citizens, an ecologically sound and balanced living environment; (3) create the conditions for rational and sustainable management of natural resources for present and future generations; (4) establish the fundamental principles intended to manage and preserve the environment against all forms of degradation in order to enhance the value of natural resources and fight against all kinds of pollution and nuisances; and (5) sustainably improve the living conditions of the population while respecting the balance with the surrounding environment [11]. The national health policy focuses on high-impact interventions to control the diseases that contribute most to the burden of morbidity and mortality, the main determinants of reproductive and child health, and other determinants of health at the community level. The health policy defines three strategic directions, namely: (1) strengthening prevention services and access to drinking water, hygiene and sanitation at the family level (MSHPAUS, 2013); (2) the Togolese government's ratification of the eThekwini Declaration on Hygiene and Sanitation, in South Africa, February 2008; and (3) the national action plan for the water and sanitation sector adopted in 2010 [12].

As part of the decentralization process, these measures have enabled local authorities to attach particular and major importance to waste management. While the Gulf prefecture seems to be improving the image of its urban infrastructure, the prefecture of Agoè-Nyvé in the Greater Lomé Autonomous District (DAGL) has not kept up despite the efforts made by the municipal authorities and is not immune to the problems of household waste and wastewater management. The chief town of Agoè-Nyivé 6 (Adétikopé) is affected by problems of efficient wastewater management and the sustainability of management solutions and systems.

Over the past 10 years, Adétikopé has become the new destination for the mass movement of people in search of housing close to their place of work. Indeed, with the galloping urbanization it is undergoing, the peri-urban commune of Adétikopé is faced with the issue of waste management [12,13]. The population increase and progressive urbanization of this locality and the administrative promotion of services and the economic boom have obviously been accompanied by a massive production of household wastewater, resulting in the anarchic dumping of wastewater in the streets and close to dwellings. Added to this is open defecation, particularly around the main market, and the dumping of septic tank effluent on vacant lots, a situation that becomes critical during the rainy season. The studies carried out present the built environment, household practices, the availability and analysis of ground and surface water, the development of the commune in terms of industrial infrastructure and administrative promotion without a link to sustainable development [10,14–16].

With this in mind, the research question is what is the mode of domestic wastewater management in the commune of Adétikopé that explains the inefficiency of sanitation strategies and systems? Therefore, we formulate the hypothesis, in line with current urban governance, that the way in which domestic wastewater is managed in the commune of Adétikopé and the sanitary behaviors of households are the result, on the one hand, of the lack of state resources to provide sanitation services and, on the other hand, of the economic and financial situation of households and the absence of viable and sustainable alternative solutions. Aware of the role that academics should play in sustainable governance, we propose to diagnose the current state of the sanitation system in Adétikopé, the capital of the commune of Agoè-Nyivé 6. Specifically, this will involve (1) assessing wastewater management by taking stock of basic sanitation facilities (latrines, cesspools, bins) in households, (2) assessing wastewater management practices in households, and (3) analyzing the level of knowledge of households in terms of wastewater management, with a view to finding a solution that will enable the sustainable development of Adétikopé.

2. Materials and Methods

2.1. Study Framework

2.1.1. Geographical Scope of the Study

Adétikopé is the capital of the Commune of Agoè-Nyivé 6 under Law No. 2017-008 of 29 June 2017 on the creation of communes, amended by Law No. 2019-001 of 9 January 2019, and is located north of Lomé on Route Nationale N°1 (RN 1), some 20 km from the Atlantic Ocean. The Commune of Agoè-Nyivé 6 is made up of twelve (12) villages and is crossed from south to north by RN 1, which forms the backbone of its road network. With a surface area of 56.6 km^2, it makes up more than a third of the surface area of Agoè-Nyivé prefecture (26%) and is larger than the other communes in the prefecture [17]. The area has seen rapid growth due to its proximity to Lomé and the housing opportunities that attract people because of the cheap land and rents. The municipality has seen a massive population influx, reaching 12,269 inhabitants in 2010 and 23,371 inhabitants and 51,163 inhabitants, respectively, according to the Mass Treatment (TDM) of Neglected Tropical Diseases (MTN), in 2017 and 2020. It has a population of 110,194 according to RGPH 5, 2022 (Figure 1).

2.1.2. Scientific Framework

The study project was carried out at the Regional Center of Excellence on Sustainable Cities (CERViDA-DOUNEDON) of the University of Lomé. The household survey and the statistical studies were carried out with the support of the Center for Educational, Societal, Policy and Development Objectives Expertise of the African Institute for Bio-medical, Agro-Food, Societal and Environmental Sciences (IASBASE).

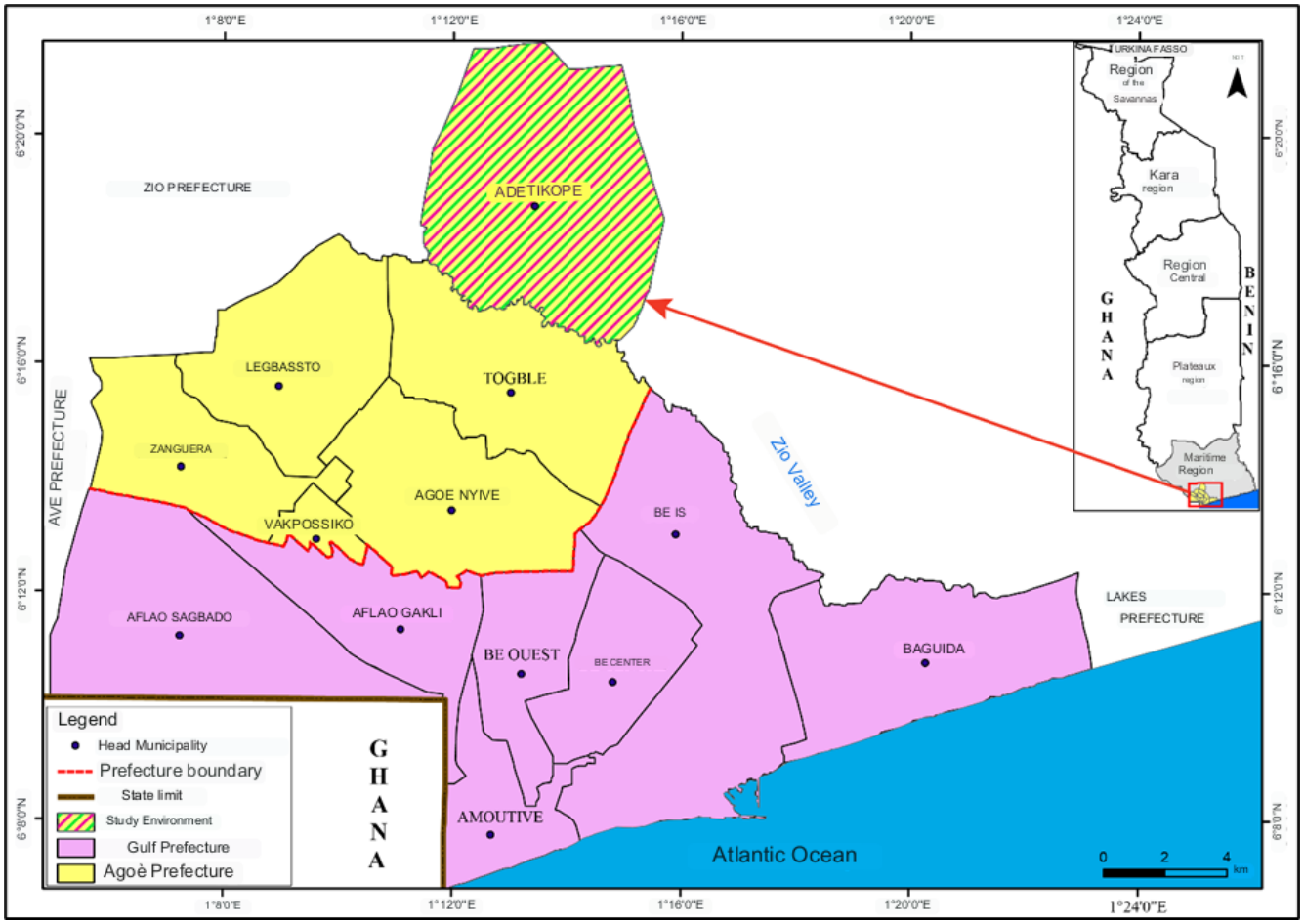

Figure 1. Geographical location of the commune of Agoè-Nyivé 6 (Source [15]).

2.2. Study Material

Study Population

It was made up of households from the 12 villages of Adétikopé; the head of the technical division of the Commune of Agoè-Nyivé 6; the staff of the CMS Adétikopé (the head of the hygiene and sanitation department and the supervisor of the medical department); the councilor and secretary of the town hall of Agoè-Nyivé 6 and the head of the Village Development Committee (CDV).

2.3. Study Methods

2.3.1. Type of Study

This was a cross-sectional and descriptive study of the knowledge, attitudes and practices of the population of the Adétikopé locality in terms of household waste management, which took place from August 2022 to July 2023, including the preparatory phase, data collection and processing.

2.3.2. Method Used for Data Collection

To carry out our study, we proceeded with a preparatory phase consisting of obtaining a field trip authorization from the CERViDA-DOUNEDON management (Authorization N° 45/AT/D/CERViDA-UL/2022) and a survey authorization from the Agoè-Nyivé 6 town hall (Authorization N°0274/RM/PA-N/CA-N6/SG) and drafting a preparatory document that identified the structures visited for data collection, the people targeted and the information sought. It also covered the identification and preparation of survey tools and the planning of activities. The document review enabled us to consult all of the documents,

reports, dissertations and articles produced in the study area or related to our research theme, in order to gather data on sanitation and demographics for the design of this document. Research was carried out in the following structures: the library of the School of Medical Assistants, CEESPOD and IASBASE; the CMS in Adétikopé; the Adétikopé town hall; the secretariat of the chief township of Adétikopé; and scientific platforms such as Google Scholar and Web of Science.

2.3.3. Sampling

Method and technique: A visit was made to the locality of "Adétikopé centre" in order to gain a better understanding of the problems of household waste management in the area. This visit enabled us to define our objectives. The primary statistical unit was the household, and the secondary unit was the head of household or his/her representative. The heads of the departments were chosen on the basis of their involvement in household waste issues. Thus, the head of the hygiene and sanitation department, the head of the Village Development Committee (VDC), the head of the technical division and the secretary of the Marie were contacted in order to gather their experience of household waste management.

Sample criteria and purpose: The study covered all 12 villages in the commune of Agoè-Nyvé 6 (Table 1). According to available demographic data from the RGPH5, the locality of Adétikopé has 110,194 people, including 53,910 men and 56,284 women (Table 1). According to the survey results, the average household size in urban areas is 4.5 people. The number of households is, therefore, estimated at 24,487 households (110,194/4.5).

Table 1. Population and households in the 12 villages of Adétikopé (source: RGPH 5, 2022).

12 Villages of Adétikopé	Number of Men	Number of Women	Total	Total Households Surveyed
Adetikope-Centre	8708	9325	18,033	1128
Agnave	3625	3687	7312	458
Devime	5098	5447	10,545	660
Dzove	3104	3098	6202	388
Adoglove	2134	2169	4303	269
Lomenyo KOPE	2075	2120	4195	263
Kpokpome-Agute	13,608	14,385	27,993	1752
Agotime	1923	1901	3824	239
Kladjeme	4253	4371	8624	540
Kpotave	5432	5632	11,064	693
Tonoukouti	2396	2466	4862	304
Tsikplonou-Kondji	1554	1,683	3237	203
Total Commune Agoe-Nyive 6	53,910	56,284	110,194	6898

Given a confidence level of 95%, i.e., a margin of error of 1%, the sample size (n) can be calculated as follows using Robert Magnani's formula [18]:

$$n = \frac{tp\ 2 \times\ P(1-P) \times\ N}{tp\ 2 \times\ P(1-P) + (N-1) \times\ y2} \quad (1)$$

with: n (sample size); p (estimated proportion of the population with the characteristic (0.5 by default)); tp (confidence level (the standard value of the 95% confidence level will be 1.96)).

y (margin of error set at 5%); N (number of households (N = 24,487))

We have

$$n = \frac{(1.96)\ 2 \times 0.5(1-0.5) \times 3806}{(1.96)\ 2 \times 0.5(1-0.5) + (24,487-1) \times (0.01)2} \quad (2)$$

Therefore, n = 6898.

The sample size was, therefore, set at 6898 households. The ratio 6898/24487 (number of households surveyed to total number of households), i.e., 28.1%, was used to calculate the breakdown by neighborhood. The data for this breakdown are shown in Table 2.

Table 2. Data collection techniques and tools.

Technical	Tools	Target
Observation	Observation grid	General neighborhood environment Household environment
Maintenance	Interview guide	Head of the town hall's technical division Head of the CMS hygiene and sanitation department Head of CDV Town councilor and secretary
Questionnaire survey	Questionnaire	Head of household/representative
Literature review	Tabulation sheet	Consultation register, scientific websites

Choice of concessions and households: In the neighborhoods, we moved around the concessions using the pen-throwing method practiced by the interviewers. In this method, the interviewers throw the pen at the entrance to the neighborhood and follow a straight line from the end of the pen to the end of the neighborhood. If the enumerators finish a line without having reached the number of households to be surveyed, they turn right and repeat the throw until they have reached the desired number of households in the concessions. A questionnaire covering sanitation items was administered to each household. In the households, it was the head of household or his or her representative who was surveyed. The representative for the head of the household was either his wife or his child who had reached the age of 18. One household per concession was surveyed. The first household å from the left in each concession was surveyed. In a concession with only one household, the said household was systematically retained. If the residents in the first household selected for the survey were absent, the next household was surveyed.

2.3.4. Data Collection Techniques and Tools

The techniques and tools used to collect the data are set out in the table below (Table 2).

Inclusion and non-inclusion criteria: The main inclusion criterion was actual presence during the survey and consent to respond to the interviewers. Those who met the criterion of head of household or his or her representative, households that had been resident in the locality for more than 3 months, the head of the technical division, the municipal councilor, the staff of the CMS and the head of the VDC were included. Excluded were all heads of households who did not wish to be surveyed or were absent at the time of the survey, visitors to households and those who did not meet the head of household criterion.

2.3.5. Conduct of the Survey

The data collection phase took place from August 2022 to July 2023 in the neighborhoods of Adétikopé. Teams of three (3) were set up, and each team included two (2) community health workers (CHWs). Before arriving in the neighborhoods, the interviewers first went to the house of the village chief to present the objectives of the survey. In the households, the interviewers first went through the formalities of civility before explaining the objectives of the survey to the households.

2.3.6. Data Processing

The counting of the survey sheets was both manual and computerized using Excel 2016. The descriptive statistics were obtained by one-way ANOVA because the analyses focused on a single variability factor. The ANOVA test was applied to the factors or indicators of variability (sociodemographic data) as well as the levels or modalities of variability (sex, age, location, etc.) of the categorical explanatory variables (household sanitation

in Adétikopé) that would explain the variable explained (sustainable development of Adétikopé through household public health practices).

For inferential statistics, the collected data were entered and formatted in accordance with EPI info version 6.04 fr of April 2001 developed by CDC Atlanta, a software package used to carry out all the processing and analysis. The values obtained were compared using the significance level p. Values of $p < 0.05$ are considered significant, and values of $p < 0.01$ are considered highly significant. Values are expressed as mean value ± standard deviation. The axes of these statistical treatments were the descriptive statistics of the socio-demographic parameters (level of education, age and sex), the hierarchical classification based on multivariate component analysis (analysis of physico-chemical and microbiological analysis categories) and the descriptive statistics of the groups obtained (Me: mean, CV: coefficient of variation), respectively, to test and describe the variation in the values obtained. The following assumptions were made: (1) Assumption H0: no significant variation between the percentages compared; (2) Assumption H1: there is a significant variation between the percentages compared. The value of the probability p' is given by the Epi info6 software. The decision and conclusion were as follows: (1) If $p' < p$: H1 is accepted; it is concluded that there is a significant variation between the percentages of the values compared. The value may have a significant increase or decrease in relation to the target value; (2) If $p' > p$: rejection of H1; it is concluded that there is not a significant variation between the percentages of the values compared. The percentages were compared sample by sample and between sampling sites. Epi info6 does not give the probability value α' when the percentage of modalities is obtained from a small number of people (n = 5).

2.4. Ethical Aspects of Research

The administrative formalities were completed before the start of our study. This involved the field trip authorization issued by the CERViDA-DOUNEDON management. The survey authorizations issued by the Town Hall and DPS authorities provided reassurance to the households and the Adétikopé CMS staff. The questionnaire was administered to households with the consent of the respondent. Measures were taken to guarantee the anonymity of the respondents, so the tools did not contain any information about their identity. In addition, the study was carried out in strict compliance with barrier measures against the coronavirus (COVID-19), with respect for the population and their cultural values.

2.5. Difficulties Encountered

The difficulties encountered were: (1) the reluctance of some households to give information related to their daily practices; (2) the mistrust of some concessions toward a foreign presence for fear of coronavirus contamination; (3) the slowing down of the pace of work by the protocols to be followed in the administrative services to obtain authorizations; (4) the refusal by some households to have photographs taken, and (5) the refusal of some women to answer questions in the absence of their husbands.

3. Results

3.1. Household Solid and Liquid Waste Management

Table 3 shows the breakdown of respondents by gender, employment status, religion and level of education.

Of the 100% of households surveyed in the 12 villages of the peri-urban commune of Adétikopé, 27.40% of respondents were male and 72.60% were female. The ages of the household respondents were divided into six age groups. The majority of respondents belonged to the age group [30–40]. A proportion of 20.55% were in the age group [40–50]. Proportions of 19.98%, 15.75%, 3.42% and 0.68% belonged to the age groups [20–30], [50–60], [60–70] and [0–20], respectively. In terms of tenure status, 53.42% had their own property, 30.14% rented, and 16.44% lived in family properties. The majority of respondents practiced

Christianity (70.55%), 8.90% were animists, and 20.55% were Muslims. With regard to the level of education of the respondents, 64.38% had secondary education, 22.60% had primary education, 3.42% had university education, and 9.59% had not attended school.

Table 3. Socio-demographic characteristics of the population.

Indicators	Terms	%	*p*. Values
Neighborhoods	Adétikopé Adoglové	15.07%	<0.05
	Adétikopé Agnavé	21.92%	-
	Adétikopé Agotimé	6.16%	<0.001
	Adétikopé Centre	12.33%	<0.001
	Adétikopé Dévimé	4.11%	<0.001
	Adétikopé Djové	2.05%	<0.001
	Adétikopé Kladjémé	6.85%	<0.001
	Adétikopé Agouté	10.96%	<0.001
	Adétikopé Kpotavé	5.48%	<0.001
	Adétikopé Lomenyo Kopé	4.11%	<0.001
	Adétikopé Tonoukouti	3.42%	<0.001
	Adétikopé Tsikponou Kondji	7.53%	<0.001
	Total	100.00%	
Gender	Female	72.60%	-
	Male	27.40%	<0.001
	Total	100.00%	
Age	[0–20]	0.68%	<0.001
	[20–30]	19.98%	<0.001
	[30–40]	39.61%	-
	[40–50]	20.55%	<0.001
	[50–60]	15.75%	<0.001
	[60–70]	3.42%	<0.001
	Total	100.00%	
Occupancy status	Rental	30.14%	<0.001
	Family properties	16.44%	<0.001
	Personal properties	53.42%	-
	Total	100.00%	
Religions	Animist	8.90%	<0.001
	Christian	70.55%	-
	Muslim	20.55%	<0.001
	Total	100.00%	
Level of education	Out of school	9.59%	<0.001
	Primary	22.60%	<0.001
	Secondary	64.38%	-
	University	3.42%	<0.001
	Total	100.00%	

Table 4 shows the distribution of the heads of household encountered during our survey according to their main occupation.

The majority of respondents were shopkeepers (29.45%). Housewives and craftsmen represented 24.66% and 17.12% of respondents, respectively. Farmers, wage-earners and retailers each accounted for 8.90%. Motorbike taxi drivers represent 0.68%, and others 1.37%. The average household size was 5.6 ± 3.2 people, and the maximum number of people per household was 32.

The data (Tables 3 and 4) reflect the socio-demographic characteristics of the heads of households in Adétikopé, i.e., the different villages in the commune, gender, age, religion, educational level of the population, household occupancy status, occupation of the heads of households and average household size. These data are important for characterizing demographics.

Table 4. Socio-demographic characteristics of the population (continued).

Indicators	Terms	%	*p*. Values
Main occupation of head of household	Farmer	8.90%	<0.05
	Artisan	17.12%	<0.05
	Car/Motorcycle Taxi Driver	0.68%	<0.001
	Shopkeeper	29.45%	-
	Housekeeper	24.66%	<0.05
	Retailer	8.90%	<0.001
	Employee	8.90%	<0.001
	Other	1.37%	<0.001
	Total	100.00%	
Average household sizeMode	M-1	2.05%	<0.001
	M-2	4.79%	<0.001
	M-3	13.01%	<0.06
	M-4	19.86%	<0.09
	M-5	10.27%	<0.001
	M-6	20.66%	-
	M-7	10.33%	<0.05
	M-8	9.65%	<0.05
	M-9	5.54%	<0.05
	M-10	2.11%	<0.001
	M-11	0.06%	<0.001
	M-12	0.06%	<0.001
	M-13	0.06%	<0.001
	M-14	0.06%	<0.001
	M-15	0.06%	<0.001
	M-16	0.34%	<0.001
	M-20	0.29%	<0.001
	M-24	0.40%	<0.001
	M-32	0.40%	<0.001
	Total	100.00%	

3.2. Household Water Supply

Table 5 shows the distribution of households according to the main source of water they use and its uses.

Table 4 shows that borehole water is used most by households. In fact, 74.66% of respondents use only borehole water, 6.85% use only well water, and 6.16% use water from the TDE. Well water and borehole water are used jointly by 9.59% of respondents. According to Table 3, 80.14% of respondents use borehole water for drinking, 72.60% for cooking and 70.55% for showering. Packaged water is used only for drinking by 8.90% of respondents. Well water is used for drinking, cooking and showering by 4.11%, 15.07% and 21.92% of respondents, respectively. As for water from the TDE, 91.10% of respondents do not use it, 5.48% use it for all purposes, 2.05% for drinking and cooking, and 1.37% use it for showering and washing clothes. Regarding the source of water from the TDE, 6.62% of respondents use water from standpipes, and 93.38% are TDE subscribers.

The data presented in Table 5 give an idea of a key factor in sanitation: the availability of drinking water sources for consumption and various uses by the people of Adétikopé is an indicator of the commune's sustainable development (Figures 1–8).

Table 5. Water supply.

Indicators	Terms	%	*p*. Values
Main source of drinking water	TDE * (Togolese of the waters) only	6.16%	<0.001
	TDE and drilling	1.37%	<0.001
	Drilling only	74.66%	-
	Drilling and wells	9.59%	<0.001
	Well only	6.85%	<0.001
	Wells and TDE	1.37%	<0.001
	Total	100.00%	

Table 5. *Cont.*

Indicators	Terms	%	*p*. Values
Use made of water TDE	Drinks and cooking	2.05%	<0.001
	Shower and laundry	1.37%	<0.001
	All	5.48%	<0.001
	Do not use	91.10%	-
	Total	100.00%	
Water used for drinking	Conditioned water	8.90%	<0.001
	Borehole water	80.14%	-
	Well water	4.11%	<0.001
	TDE water	6.85%	<0.001
	Total	100.00%	
Water used for cooking	Drilling	72.60%	-
	Drilling and wells	3.42%	<0.001
	Well	15.07%	<0.001
	TDE water	8.90%	<0.001
	Total	100.00%	
Water used for showering	Drilling	70.55%	-
	Well	21.92%	<0.001
	TDE	7.53%	<0.001
	Total	100.00%	
TDE water source	TDE subscriber	93.38%	-
	Fountain bollard	6.62%	<0.001
	Total	100.00%	
Satisfaction with TDE services	Satisfied	23.08%	<0.05
	Not very satisfied	30.77%	<0.05
	Not satisfied	38.46%	-
	Does not wish to express	7.69%	<0.001
	Total	100.00%	

Note: * National company providing access to drinking water in Togo.

Figure 2. Lomegnonkopé fountain bollard (Field photo, CEESPOD, December 2022).

Figure 3. Fountain bollard at the Adétikopé C E G (Field photo, CEESPOD, December 2022).

3.3. Household Wastewater Management

According to the survey data, the public highway is the most popular place for respondents to dispose of kitchen and laundry wastewater. Of the 100% of people surveyed, 78.77% discharged their cooking and washing water onto the public highway, and 12.33% and 8.90% of respondents dumped their washing water in undeveloped plots and backyards, respectively. Kitchen wastewater was discharged by 13.70%, 6.16%, and 1.37% of respondents, respectively, into undeveloped plots, house yards and cesspools. Septic tanks and undeveloped plots were the places most used by households for discharging or draining wastewater. Indeed, 58.22% discharged this wastewater in septic tanks, and 32.19% on unbuilt plots. Of the 100% of people surveyed, 85.62% had a stool latrine, while only 14.38% said they did not have one. The majority of respondents (54.40%) had traditional pits, 30.47% had ventilated improvised pit (VIP) latrines, and 15.13% had manual flush latrines. Of the respondents with latrines, 93.60% said their latrines were in good condition, 4% said their latrines were in acceptable condition, and 2.40% said their latrines were in poor condition. According to the survey data, 68% of respondents maintained their toilets or latrines twice a month, 31.20% once a week, and 0.80% once a month. As for the frequency with which latrines were emptied, 2.40% emptied their pits every 3 years, 3.20% every 2 years, 66.40% had never done so, and 26.40% did not know. The majority of respondents (80.14%) thought that their latrine pits were never emptied or did not know whether their latrine pits were emptied. Additionally, 5.48% of respondents said that their pits were emptied by lorry, and 99.20% of respondents were unaware of the final treatment given to emptied pits. Respondents without latrines defecated in a variety of places. Thus, 14.28% defecated with neighbors, 66.67% in the open, and 19.05% in public latrines. Households with children disposed of their children's feces in a variety of places. Thus, 85.62% dumped their children's feces in the open, and 14.38% said they dumped their children's feces in a toilet. Flooding occurs in the homes of 12.33% of respondents and in the neighborhoods of 11.64%, whereas 87.67% said they had not experienced flooding in their compound, and 88.36% said there was no flooding in their neighborhood. A 67.12% share of respondents said they knew where the lorries were dumped, while 32.88% had no idea where the lorries were dumped. The data presented in Tables 6 and 7 provide information on indicators for a second aspect of sanitation, namely the fate of water after use within households. The health of the population depends on the attention paid to this aspect.

Table 6. Wastewater and excreta management.

Indicators	Terms and Conditions	%	*p*. Values
Discharge points for kitchen water	In the courtyard of the house	6.16%	<0.001
	In a sump	1.37%	<0.001
	On the public highway	78.77%	-
	On an undeveloped plot	13.70%	<0.001
	Total	100.00%	
Discharge points for washing water	In the courtyard of the house	8.90%	<0.001
	On the public highway	78.77%	-
	On an undeveloped plot	12.33%	<0.001
	Total	100.00%	
Drainage/discharge of wastewater	Septic tank	58.22%	-
	On the public highway	6.16%	<0.001
	On an undeveloped plot	32.19%	<0.001
	In a sump	3.42%	<0.001
	Total	100.00%	
Existence of latrines in the concession	Yes	85.62%	-
	No	14.38%	<0.001
	Total	100.00%	
Types of latrines	Traditional pit	54.40%	-
	Ventilated improvised pit (VIP) latrines	30.47%	<0.001
	Manual flush toilet (TCM)	15.13%	<0.001
	Total	100%	
Condition of latrines	Good	93.60%	-
	Acceptable	4.00%	<0.001
	Bad	2.40%	<0.001
	Total	100%	
Frequency of toilet/latrine maintenance	Twice a month	68.00%	-
	Once a month	0.80%	<0.001
	Once a week	31.20%	<0.001
	Total	100%	
Frequency of latrine emptying	Once every 3 years	2.40%	<0.001
	Once every 2 years	3.20%	<0.001
	Once a year	1.60%	<0.001
	Never	66.40%	-
	Do not know	26.40%	<0.001
	Total	100%	

Table 7. Wastewater and excreta management (continued).

Indicators	Terms and Conditions	%	*p*. Values
Method of emptying the pit once it has been filled	Emptying truck	5.48%	<0.001
	Never emptied + do not know	80.14%	<0.001
	Total	85.62%	
Final treatment after emptying	Do not know	99.20%	<0.001
	Other	0.80%	<0.001
	Total	100%	
Places where latrines are not available	In the wild	66.67%	<0.001
	The neighbors	14.28%	<0.001
	In a public toilet	19.05%	<0.001
	Total	100%	
Places where children's feces are discharged	In a toilet	14.38%	<0.001
	In the wild	85.62%	<0.001
	Total	100.00%	

Table 7. *Cont.*

Indicators	Terms and Conditions	%	*p*. Values
Observation of flooding in the concession during the rainy season	Yes	12.33%	<0.001
	No	87.67%	<0.001
	Total	100.00%	
Observation of flooding in the neighborhood	Yes	11.64%	<0.001
	No	88.36%	<0.001
	Total	100.00%	
Knowledge of what happens to the place where the lorries are emptied	Yes	67.12%	<0.001
	No	32.88%	<0.001
	Total	100.00%	
Condition of gutters	Bad	0.68%	<0.001
	Do not exist	99.32%	<0.001
	Total	100.00%	

Figure 4. Sanitary facilities in a house in Tonoukoutsi (field photo, CEESPOD, December 2022).

Figure 5. Wastewater on the road to Adétikopé-Centre town hall (field photo, CEESPOD, December 2022).

Figure 6. Wastewater on the road to Adétikopé town hall (field photo, CEESPOD, December 2022).

Figure 7. Wastewater reservoir in the center of Adétikopé (field photo, CEESPOD, December 2022).

3.4. Knowledge of Wastewater Management

Table 8 shows the distribution of respondents according to their knowledge of waste management and recycling.

Table 8. Information on wastewater recovery.

Indicators	Terms and Conditions	%	Capital Gains
Knowledge of wastewater management	Yes	58.22%	<0.001
	No	41.78%	<0.001
	Total	100.00%	<0.001
Information channel on wastewater management knowledge	Media	56.22%	<0.001
	Rue	2.00%	<0.001
	NA	43.15%	<0.001
	Total	101.37%	<0.001
Knowledge of wastewater reclamation	Yes	62.33%	<0.001
	No	36.30%	<0.001
	No answer	1.37%	<0.001
		100.00%	<0.001
Knowledge of the health hazards of wastewater	Yes	96.58%	<0.001
	No	2.74%	<0.001
	No answer	0.68%	<0.001
		100.00%	<0.001

Of the respondents, 58.22% knew about waste management, and 62.33% about waste recovery. However, 41.78% said they had no knowledge of waste management, and 36.30% had never heard of waste recovery. The majority of respondents (56.22%) had heard about waste management via the media (radio), and 2% had heard about it in the street. A 96.58% share of respondents knew wastewater poses a health risk, while 2.74% did not know that wastewater poses a health risk. The data collected in Table 8 relate to the treatment of water after use. These data are specific in that they concern the recovery of wastewater.

Figure 8. Wastewater sampling at Adétikopé (field photo, CEESPOD, December 2022).

3.4.1. Raising Awareness of Sanitation Issues in the Hygiene Department

The results show that only 2.87% of households (n = 7) mentioned the presence of the Basic Hygiene and Sanitation Service (SHAB) in the locality to raise awareness of sanitation issues.

3.4.2. Interview with the Head of the Basic Hygiene and Sanitation Department

This interview showed that public awareness is raised four times a month, once a week, on the issue of environmental sanitation. Home visits are also made four times a month, i.e., once a week. The department is not involved in the installation of sanitation facilities by the public. The department does not have a sanitation plan for the area. The department has suggested that the town hall should get involved in managing sanitation problems, organize awareness-raising sessions involving the village chiefs, and provide the department with more staff (hygiene and sanitation technicians).

3.4.3. Interview with the Head of the Town Hall's Technical Division

To manage domestic wastewater, the town council is raising awareness, regulating pipe connections to the streets, and carrying out regular household inspections. As far as rainwater and excreta management is concerned, nothing has yet been envisaged, and projects are still in the pipeline. There are no public latrines in the commune.

3.4.4. Interview with the Head of the Village Development Committee

The interview with the head of the VDC showed that there are no public latrines or dustbins in the public squares. Each neighborhood organizes awareness-raising sessions on hygiene and sanitation.

3.4.5. Interview with the Town Hall Councilor

The interview showed that, in terms of domestic wastewater management, the town council plans to work with the CMS SHAB to put in place a local sanitation policy. Awareness-raising sessions and community work have been discontinued because of the COVID-19 pandemic.

3.4.6. Observation Grid for the General Environment of the Village

Observation of the general environment in Adétikopé revealed 72 uncontrolled dumps in the 12 villages. Gutters were built during the redevelopment of the RN°1 to evacuate rainwater, and in some neighborhoods the gutters were built by the residents themselves. Domestic sewage was found in all neighborhoods.

4. Discussion

With regard to existing research, a critique was made of the rigor of the methodology and the main results obtained, with a view to making a few suggestions.

Methodology of the study: In our study, the household survey was random and took into account all socio-professional and religious strata without discrimination as to standard of living, since it covered the different types of housing. In this way, the results obtained give a picture of the practices and habits of the majority of households and can, therefore, effectively represent the reality of the daily lives of the entire population of the city. These results can also be used as an aid to decision-making with a view to improving citizens' living conditions. However, our results concern only 5256 out of nearly 24,487 households in the locality. A survey with a larger sample would provide even more reliable and accurate data. However, this study, conducted with a margin of error of 0.01%, guarantees results that are more reliable for extrapolation than if it were conducted with a margin of error of 0.05%, as in most studies. Also, the survey was aimed at heads of household, but it turned out that in the field, we had to record the men present at the time of the survey as respondents (being heads of household), even though it was their wives who had to answer the questionnaire, since the answers stemmed from household activities. A redefinition of

the respondent in this type of research would make it possible to dissociate the respondents, who should be mostly women, from the heads of household, who are often men.

Socio-demographic characteristics: Our survey covered 5256 heads of household in the peri-urban commune of Adétikopé. The results showed that 27.40% of the heads of household or representatives were men and 72.60% were women. The female predominance found in our study was also found by Guidi in the same locality in 2020 but at a higher proportion [19]. There are several possible explanations for the predominance of women in households. At the time of our visit to the households, women were much more likely to be encountered, while the men were off about their business. There was also a predominance of women in the population. In a similar study conducted by Titone in the prefecture of Agou in Togo in 2020, the majority level of education was secondary [20]. The average age of the men and women surveyed was 40.83 ± 11.05 years, and their ages ranged from 20 to 70 years. Most of them had at least an average level of school education (64.38% and 3.42%, respectively, for secondary and university education); 9.59% of them had never been to school. This level of education may also reflect the socio-economic standard of living of households faced with a number of unhealthy and environmental problems. Similar studies by Titone in Agou1 in 2020 and Tchakou in Vo3 in 2021 also reported average secondary school ages of 47.75 and 45, respectively [20,21]. Similarly, Guidi found that 18.72% of households surveyed in Adétikope in 2020 did not attend school [19]. His results are similar to those of a study carried out in 2022 on 350 heads of household in the 20 neighborhoods of the town of Vogan, which showed that 54.00% of the heads of household or representatives were men and 46.00% were women. The average age of the men and women surveyed in Vogan was 45.43, with ages ranging from 18 to 82; most had at least an average level of education (47.43% and 3.14%, respectively, for secondary and university education), while 20.86% had never been to school. Regarding occupation, 29.45% of heads of household were shopkeepers. This was the observation made in 2020 by Guidi and Titone in Agoé Nyivé 6 and Agou Gadzépé, respectively [19,20].

Identification of the socio-professional characteristics of the respondents: The income-generating activities were in trade; in reality, most of them were in petty trade or the resale of products. This observation was made in another town in Togo, where 26.23% of the responded surveyed were involved trade [22]. In 2022, Nyakpo's study showed that trade was the most common activity in Vogan [23]. Modern and high-standard housing accounted for 79.45% of the households surveyed, with 53.42% personally owned, 16.44% family-owned, and 30.14% rented. Referring to previous works, these results reflect the Vogan study, which found that four out of five households surveyed (81.43%) lived in concessions of fair quality (medium standard) in relation to the population's relatively average standard of living, with traditional concessions estimated at 12.57%. Of the households surveyed in these concessions in Vogan, 43.14% were owners, 32.57% family members, and 24.29% tenants [23]. The average number of people per household was 5.6 ± 3.2, with a high proportion of six-member households. In Vogan, the average number of people per household was 5.2, with four (4) people per household being the most represented [23]. These results reflect those of the QUIBB 2015 survey, according to which the average household size in Togo was 4.7 in general and, in particular, 4.1 in urban areas and 5.3 in rural areas [10].

Water supply: This study notes three main sources of water supply (borehole water, TDE water and well water), as do the results of QUIBB Togo 2015 [10]. Specifically, our results show borehole water as the main source of supply (74.66%), with 80.14% of respondents stating it was used for drinking water, and 72.60% for cooking water. The QUIBB Togo 2015 results corroborate other findings by Nyakpo, who in a study in Vogan showed that borehole water was used most by households in the town of Vogan. In fact, 53.43% of households used it as their main source of water, ahead of water from the TDE and wells. This use concerns almost all household water needs (55.14% for drinking and 53.71% for cooking and showering) [23]. Our results are similar to those of Guidi, who showed in 2020 that borehole water was used more in Adétikope, 61.70% for drinking and

50.21% for cooking [19]. Although the TDE service was available, the supply did not cover all of the town's localities, so many households relied on boreholes for their water needs. Unfortunately, all of the operators questioned said that they had not analyzed the water from the boreholes before using it, including those who sold it, which constitutes a real health hazard for consumers.

Existing wastewater and excreta management system: Gray water management is a problem in the locality. Only 1.37% of households have a cesspool for draining gray water, and discharge onto public roads reaches 78.77%. These results corroborate the data from the QUIBB 2015 survey, which had estimated the discharge of wastewater onto streets in Lomé and in urban areas at 52.5% and 53.0%, respectively [10]. The same observation was made by Awou and Kpizou, who showed that the majority of laundry and kitchen wastewater is poured into the streets [24,25]. The other places where wastewater was discharged were courtyards, undeveloped plots and gutters. In 2022, few households in Vogan had cesspools or pits to collect wastewater from washing (18.29%) and cooking (18.57%). In fact, more than half of our respondents dumped this liquid waste on the public highway in 54.00% and 52.00% of cases, respectively [23]. As far as latrines are concerned, 85.62% of households had latrines in their concessions. These results reflect the reality of the situation in metropolitan Lomé and its urban perimeter. Tchindou in 2019 found that 84% of his respondents had a latrine in their concessions, 29% of which were the VIP type [26]. These results are close to our own, proof that our communities share almost the same realities when it comes to sanitation. Nyakpo revealed that almost nine out of ten households (89.43%) in the town of Vogan had a latrine, 95% of which were in good condition. Essentially three types of latrine were found in the households surveyed: traditional pits (38.02%), VIPs (32.91%) and manual flush toilets (29.07%). Open defecation (DFAL) was practiced by 3.14% of the population surveyed. Titone in 2020 found a DFAL rate of 5.86% in Agou Gadzépé, while Awou in 2011 found that the DFAL rate in Kpalimé was 16% [20,24]. Although these different data do not overlap, they describe a decrease in the phenomenon over time, considering that these localities are experiencing almost the same realities. DFAL is often a source of fecal peril, which is an important factor in the prevalence of several diseases, in particular diarrhea, cholera, intestinal parasitosis, typhoid fever, hepatitis A, poliomyelitis, etc. The provision of appropriate facilities, awareness-raising campaigns and raising people's awareness could help stop this practice. Among households without latrines, 66.67% defecate in the open, compared with 14.28% at neighbors' homes and 19.05% in public toilets. The almost total absence of public toilets in the commune (only one latrine per village) explains why this high number defecates in the open. Tchindou in Tsévié also reported that 15% of his respondents threw children's feces directly onto a rubbish dump [26]. In Vogan, among households without latrines, 29.73% defecated in the open, while 13.51% used their pigsties installed in their homes. Additionally, 2.57% said they used public latrines to defecate. Another form of open defecation in Vogan is the dumping of children's feces on rubbish dumps or in the open air, which increases the health risks associated with fecal peril. Some households with children throw their feces into the dustbins (10.19%) or directly onto the dump (13.42%). This practice exposes children, who are used to wandering from dump to dump or rummaging through bins looking for recyclable waste, given that many households do not sort their waste at source before throwing it away.

Knowledge of waste management: More than three out of five respondents (62.29%) said they had heard about waste management at least once, the majority through local radio stations (50.00%) and health workers (24.31%).

Excreta management: The lack of latrines in households is still a problem in countries with limited resources. According to the literature review, this observation has already been made in another study in which not all households had latrines [20]. This situation encourages open defecation, which causes diarrheal diseases such as cholera. Even when latrines do exist, they are of various types, most of which do not meet hygiene standards. The difficulty for households, most of which have low incomes, is to afford modern latrines

with watertight septic tanks. This represents a huge financial outlay that is beyond the reach of household budgets. Other studies in other communes have made the same observation [22,27,28].

The availability of latrines in the concessions, together with good management of these, through their maintenance and the proper disposal of the sludge, guarantee the health safety of the population. This remains a challenge for households. The management of fecal sludge, and in particular its disposal, requires specific resources and facilities that the commune does not currently have, which is a problem for households. Emptying is carried out by mechanical emptying trucks run by private companies from the city of Lomé. This service is expensive, and only households that can afford the cost use it. Otherwise, the waste is emptied manually, polluting the environment. Several studies have shown that very few households use emptying trucks [20,27].

With regard to fecal sludge, 66.40% had never emptied their toilets, and 80.14% did not know the exact process for managing latrines. In the Nyakpo study in Vogan, more than half (53.14%) of respondents said they had never emptied their toilet pits. Other respondents, particularly tenants, did not even know whether their latrine pits had ever been emptied. Manual emptying, despite the risks involved, was still practiced by a small proportion of our respondents (1.14%). Filling latrine pits depends on several factors, including the size and use of the structure (the number of people using it). It has to be said that many of our respondents who had emptied their pits at least once expressed the difficulties they had encountered before finding an emptying lorry, which most often came from Lomé. Emptying by lorry was chosen by 16.57% of our respondents, and all of them did not know where the emptied sludge was to be dumped or how it was to be treated, as the town of Vogan, like other towns in the country, does not yet have a sludge treatment plant.

Domestic wastewater management: Domestic wastewater is managed individually in the municipality. From inside to outside, each household manages its own wastewater without worrying about its neighbors. The study showed that most households have a shower but not necessarily a sump for draining shower water. For those households that do have sumps, some are not in good condition and contribute to environmental pollution. In contrast to our study, Titone noted that the majority of households surveyed in the commune of Agou-1 in Togo did not have a shower [20]. Although households make an effort to dig makeshift pits for excreta, the water from the showers is mostly drained behind the houses on the ground, making these areas constantly damp and mosquito breeding grounds for the frequent cases of malaria. This is particularly true in the poor neighborhoods of Lomé, as shown in the study by Ahatefou et al. [29]. The same applies to waste from cooking, washing and dishwashing, which is most often spread in the street, as Awou also showed in his study [24]. As always, households give as their reason the lack of financial means to build a cesspit for kitchen, laundry, dishwashing and shower waste. The challenge is not just to build the toilets, but to build them according to the rules of the trade [30]. The uncontrolled dumping of sewage in the streets not only creates nests for mosquito larvae but also pollutes surface water and the water table, which affects the immune system, especially of children (who are often in direct contact with this sewage), in terms of parasitosis. In the neighborhoods surveyed, rainwater is not drained due to the lack of appropriate drainage systems. Some residents try to divert run-off water from their plot by installing makeshift gutters.

Households' knowledge of common diseases: Poor management of household waste encourages the production of disease vectors such as mosquitoes, flies, cockroaches, etc., which swarm in unsanitary areas and are a source of water and air pollution. Households' level of knowledge about common diseases caused by poor management of waste is fairly good. Malaria, digestive parasites and diarrheal diseases are frequently mentioned. These results are to be expected, given the presence of unauthorized rubbish dumps and, above all, the stagnation of water in the streets, since malaria and digestive parasites were the two illnesses that most frequently accounted for consultations at the Adétikopé health

center (60.44% and 16.60%, respectively). As a control method, 73.77% of the surveyed respondents used mosquito nets impregnated with long-acting insecticide (MIILDA). The services provided by the hygiene and sanitation department, which should have weighed in the balance, are almost non-existent due to a lack of human resources.

Like other developing countries, Togo is committed to achieving the Millennium Development Goals, in particular the fight against poverty and hunger, and access to a healthy and sustainable environment. According to the results of the Multiple Indicator Cluster Survey (MICS 4) (2010), only 35.6% of the population use improved sanitation facilities, and there are disparities between urban areas (73.8%) and rural areas (12%). It should be noted that many of the facilities built do not comply with standard construction plans, and the treatment systems are not appropriate. This situation and poor hygiene practices explain the recurrence of diseases linked to fecal peril, in particular gastro-enteritis and intestinal parasitosis, which account for 7% of outpatient consultations in health facilities (source: main health indicators in Togo in 2013). In addition, the sanitation sub-sector remains marked by a multiplicity of actors, including those from different Ministries [31].

Causes of consultations: The work showed that the leading cause of consultation at the Adétikopé CMS in the first half of 2021 was malaria, with a proportional morbidity of 60.44%. These results are in agreement with those of Attisso in the commune of Bassar in 2015 and Titone in the town of Gadzépé in 2020, which showed that malaria was the leading cause of consultations with proportional morbidities of 30.02% and 63.99%, respectively [20,32]. It is true that malaria is endemic in Togo. But if it is the leading cause of consultations, as several authors who have conducted studies on liquid waste management have pointed out, it is because all of these studies have found that wastewater is poorly disposed of, creating breeding grounds for the mosquitoes that cause malaria.

A review of the interviews with the head of hygiene and sanitation, the head of the village development committee, the head of the technical division and the town hall councilor revealed that the locality of Adétikopé is suffering from the poor organization of essential hygiene and sanitation services. With the creation of the new communes, the town council is gradually becoming involved in organizing the commune sanitation sector by raising awareness and monitoring and managing wastewater and excreta.

Suggestion s for a sustainable management model for wastewater and excreta: At the end of this work, we recognize that wastewater treatment remains the best way of managing wastewater and excreta with a view to good urban governance in terms of sanitation. The current wastewater and excreta management model is not part of a continuous improvement process, but remains stagnant or is even deteriorating. It is not sustainable because the underlying economic model is not in line with either social promotion or environmental protection. The model needs to be reviewed to ensure sustainable development. The reasoning remains that wastewater treatment involves extracting pollutants, removing coarse particles and eliminating toxic substances. In addition, wastewater treatment kills pathogens and produces biomethane and fresh manure for agricultural production. The link between waste management and sustainability laid the foundations for this research. Wastewater treatment is part of efforts to minimize water wastage, minimize pressure on natural water sources and create a pathway to clean energy [8].

We are formulating contextualized proposals for sustainable development of the municipality, with a view to guiding action on household waste management.

Households: (1) Include a sanitation system in the construction plan; (2) observe the decisions taken by the municipal and health authorities to ensure sound management of liquid waste in the locality; and (3) have their work and the installation of sanitation facilities monitored by specialist services.

To the village development committee: Step up public awareness campaigns on the harmful consequences of improper disposal of wastewater and excreta.

For the CMS Hygiene and Sanitation Department: Intensify awareness-raising sessions on the construction of cesspools.

To the SHAB of the DPS: (1) Continue to work with the city authorities on sanitation management; and (2) increase public awareness of liquid waste management.

To the Agoè-Nyivé 6 town council: (1) Reinforce the technical staff with a hygiene and sanitation technician for better management of sanitation-related problems; (2) set up a green brigade; (3) draw up a municipal development plan; (4) create a waste recovery system; (5) publicize and enforce the laws governing sanitation in the Togolese Republic; (6) repair decommissioned standpipes and put them into service; (7) improving people's access to drinking water (extending the drinking water supply network, particularly in new districts); (8) build public latrines in all districts; and (9) initiate the construction of a wastewater treatment plant. In addition, the general legal framework for environmental management in Togo needs to be reviewed on an ongoing basis and its day-to-day application ensured.

The treatment of rural domestic wastewater is essential for the overall improvement of the rural environment. At present, the rate of use of rural domestic wastewater resources is generally low in emerging countries, which corresponds to the actual situation in rural areas, and the low utilization underlines the need to develop rural wastewater treatment technologies [33].

5. Conclusions

The aim of our work was to take stock of household liquid waste management in the commune of Agoè-Nyvé 6. As a limitation of our study, our survey was not exhaustive enough to cover all of the populations of the 12 villages of Adétikopé. The next step in our research would be to conduct a larger survey, so that the results could be extrapolated to a larger urban area.

By the end of our study, however, we were able to highlight the city's problems with household wastewater management and the consequences that flow from it. This report provides an overview of how household waste, domestic sewage and excreta are disposed of.

These discharges have led to a lack of sanitation, which is the cause of illnesses linked to unhealthy living conditions and that are frequently encountered in the area. This study enabled us to understand the problems of household waste management in the municipality. The results of this research show that 93.85% of the concessions have an individual sanitation facility. Most of these facilities were in good working order and clean. The surveys revealed that the management of excreta and wastewater is marked by the absence of public latrines, leading to the risk of fecal contamination from open defecation. For domestic wastewater management, the use of cesspools is not widespread, with only 71.31% of households having access to existing cesspools. Most concessions use unsanitary methods to manage wastewater from cooking, washing and dishwashing, which is discharged into the environment (71.3% of households discharge it into the street).

The immediate consequence of this situation is the recurrence of the diseases mentioned by the respondents, including malaria and digestive parasites. The management of liquid waste in the commune is encountering organizational and financial difficulties. The current wastewater and excreta management model is not undergoing continuous change, but remains stagnant or is even deteriorating. It is not sustainable because the underlying economic model is not in line with either social promotion or environmental protection. This model needs to be reviewed to ensure sustainable development. For sustainable urban governance of wastewater and excreta, it is time to think about how to organize wastewater collection in our municipalities. Effective awareness-raising on the part of all those involved, along with actions such as stepping up awareness-raising campaigns and installing sanitation facilities, will not only help to clean up the environment and give the city an attractive appearance, but will also, above all, guarantee good health for the population.

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