



## Latrine management in the city of Bumba in the Democratic Republic of Congo

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### I. Introduction

Diseases linked to unsafe water, lack of sanitation and poor hygiene represent an enormous burden for developing countries. It is estimated that 88% of diarrhoeal diseases are caused by unsafe water, sanitation and hygiene (WHO, 2004; Pangodi et al., 2020). Many schools are located in communities where there is a high prevalence of diseases due to unsafe water consumption, lack of sanitation and poor hygiene, and where child malnutrition and other underlying health problems are common (Atlas, 2011).

And yet, lack of access to sanitation is one of the most aggravating factors in the spread of so-called water-borne diseases. One gram of human faeces can harbour up to a hundred parasite eggs, 10,000 viruses such as hepatitis or polio, and up to a million bacteria responsible for dysentery, cholera or diarrhoea. Diarrhoea is estimated to cause 760,000 deaths among children under the age of five, or more than 2,000 per day. By way of comparison, the Ebola virus caused around 5,000 deaths in 2014 (WHO, 2023).

Worldwide, around 2.5 billion people have no access to drinking water, while 2.6 billion people or 42% of humanity have no access to a sanitation system many people resort to open defecation or lack access to adequate sanitation facilities. The consequences of this situation can be devastating for both human health and the environment (WHO, 2019).

In the Democratic Republic of Congo, 86% of the population has no access to improved sanitation. In rural areas, this proportion rises to 96%. This situation prevents the country from achieving the Millennium Development Goals, which aim to halve the number of people without access to sanitation and drinking water (UNICEF, 2013; Kayobola, 2020; UNICEF, 2020).

The 2030 Sustainable Development Goals, in its objectives 3 and 6, respectively for health and well-being, clean water and sanitation, integrate the importance of good hygiene and sanitation for human life, and well-being (UNICEF, 2015).

Global considerations placing latrines among the important tools of sanitation and hygiene, challenged us to be able to verify in the large agglomeration of the city of Bumba, a city experiencing strong demographic growth in recent years, whether this issue is really taken into consideration by households. However, data on the subject in Bumba are not available (Linangelo et al., 2028).

This study seeks to answer the global question: do households in Bumba observe hygiene and latrine sanitation measures? Specifically, to answer the following questions: What types of latrines do households in Bumba use? What is the level of sanitation? What is the distance between the latrine and the dwelling house?

For this study, the general hypothesis is to ascertain whether households in the cité de Bumba observe latrine hygiene and sanitation measures. Specifically, to judge whether the majority of latrines are of the traditional type; whether latrine sanitation is at a low level; and whether many latrines are located close to the dwelling house.

Generally speaking, this study aims to establish an inventory of the latrines used in the city of Bumba. Specifically, it will assess the types of latrines used, their hygienic condition and their distance from the dwelling.

## II. MATERIAL AND METHODS

### Study environment and population

Bumba is a port town, capital of the Bumba territory, in Mongala Province, in the north of the Democratic Republic of Congo. Located on the right bank of the Congo River near the confluence of the Itimbiri, it is served by the RN6 national road, 167 km east of the provincial capital Lisala. The Congo River links it to Lisala to the west, and to Basoko to the east. It is linked by road to Aketi to the east, and Yakoma to the north.

The city of Bumba comprises 6 districts: Mobutu, Lingode, Lokole, Lokele-Mongala, Lokele-Molua and Nzongo, divided into 113 avenues. Bumba, chosen as a state post in 1888, became a city in 1988. In June 2013, it was granted city status, divided into five urban communes: Budja, Ebonda, Lokole, Molua and Monama. This status was not maintained when the administrative reform was implemented in 2015, and it was given the status of a rural commune. The geographical coordinates are as follows: Latitude: 2°11'15" North, Longitude: 22°28'05" East at an altitude in relation to sea level east of 362 m.

Located a week's boat ride from Kinshasa, Bumba was one of the capital's most important sources of cassava, rice and palm oil before the first Congo war. Bumba's agricultural products include rice, maize, groundnuts and cassava (ENABEL, 2019). The Bumba territory is located between 2 and 3° North latitude and 21°30' and 24° East longitude. The Bumba territory is bordered to the west by the Lisala territory, to the south by the Congo River, which separates it from the Bongandanga and Basoko territories, to the north by the Businga territory and to the east by the Bas Uélé and Tshopo districts. Its surface area is 15,498 km<sup>2</sup> and represents 22.84% of the Mongala area (Omasombo, 2011; Mopanzo, 2021).

The territory has a population of 1,298,773, with a density of 83 inhabitants/km<sup>2</sup>. It is the smallest of the three territories that make up Mongala Province, and paradoxically the most populous and the most agriculturally active. Made up of six sectors (Bandayowa, Yandongi, Loeka, Itimbiri, Molua, and Monzamboli; 48 Groupements and 792 villages (ENABEL, 2019).

In the present study, the population in question is that of the urban city of Bumba. We considered data from the Central Office of the urbano rural health zone of Bumba, i.e. an estimated population of 253,000 Inhabitants (Zone de Santé Rurale de Bumba, 2019). Materials

To achieve the objectives assigned to this study, several tools were used including Smartphone, computer, survey software (Kobocollect\_ODK) and the survey questionnaire.

### Methods

To ensure that our data collection went smoothly, we used empirical sampling as the basis for our study. A series of questionnaires was designed and programmed into the Smartphone software using the sampling method (Mataboro et al., 2016; Ngbolua et al., 2021).

The different variables to be studied were briefly distinguished by blocks of related questions. A smooth transition from one theme to another was observed, as was their relevance and coherence. All questions were closed. There was no ambiguity, and the vocabulary was simple and unambiguous. There were questions about behavior, knowledge, intention and opinion, with some identifying questions at the beginning. A "pre-test" was administered to around ten people, in order to gather feedback on the questionnaire and identify any formulation pitfalls (Gone et al., 2013).

The survey indicators were translated into questions. At the time of analysis, each question referred to a variable, i.e. a quantity that could take on several values. All the answers to a question are the modalities of each variable (in other words, the different values, not necessarily numerical, that it can take on). Analysis of the results consisted in relating the variables and comparing the results obtained with those expected when the hypotheses were formulated (WWF-PARAP, 2015).

As there was a certain ease of collection by Smartphone, with the kobotoolbox, we targeted 50 households per district; this made 300 households in total: Lokole, Lingode, Mobutu, Nzongo, Lokele Molua and Lokele Mongala.

### III. Results and discussion

#### Results

#### Gender

The gender of respondents was assessed, and the results are shown in Figure 1.

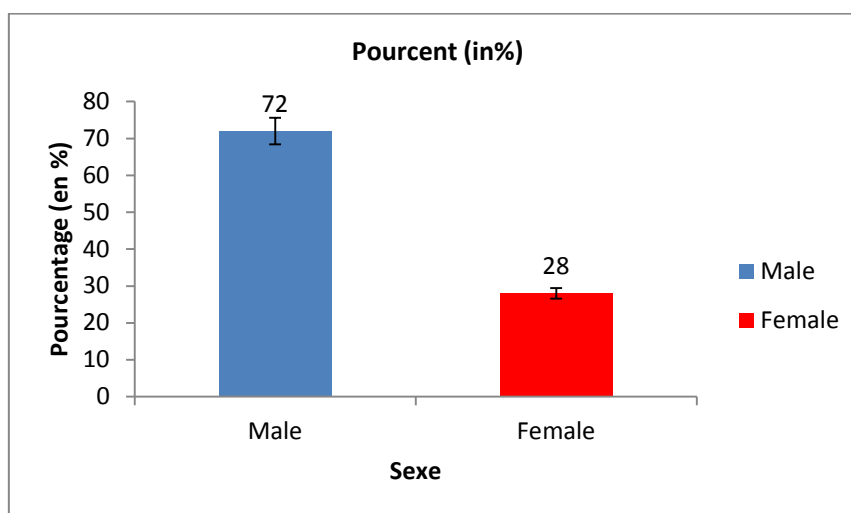


Figure 1: Gender of respondents (in %).

The results show that 28% of respondents were women and 72% were men. The higher proportion of men than women is due to insufficient communication.

Civil status Civil status was the focus of this study, and the results are shown in figure 2.

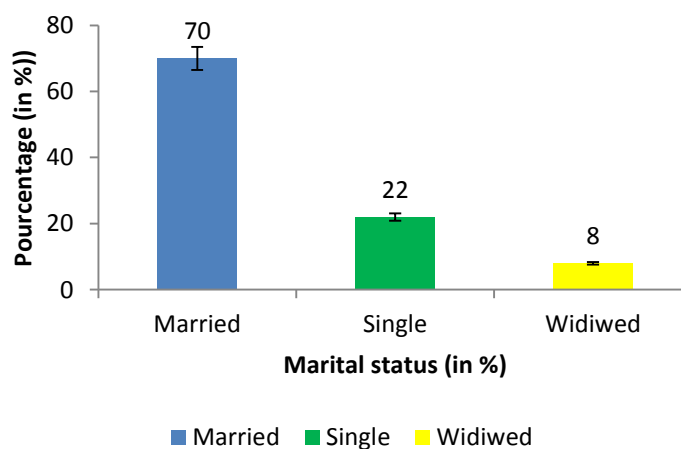


Figure 2: Marital status of respondents (in %).

The result shows that 70% of households surveyed were married, 22% single and 8% widowed. A significant social aspect, which could be at the root of a certain imbalance of commitments within households. Household size Figure 3 shows the size of respondents' households.

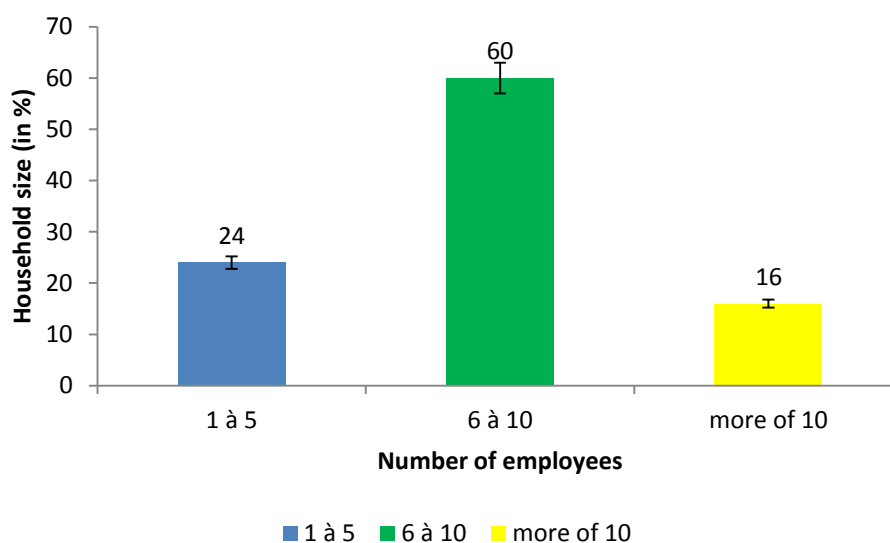


Figure 3: Household size (%).

The majority of households consist of between 6 and 10 people, with an average of 8 persons per household. This figure has been proven by previous studies. This provides ample proof of the city's growing population, which in turn has an impact on hygiene and sanitation.

#### Access to latrines

Access to latrines in Bumba was surveyed, and the results are shown in figure 4.

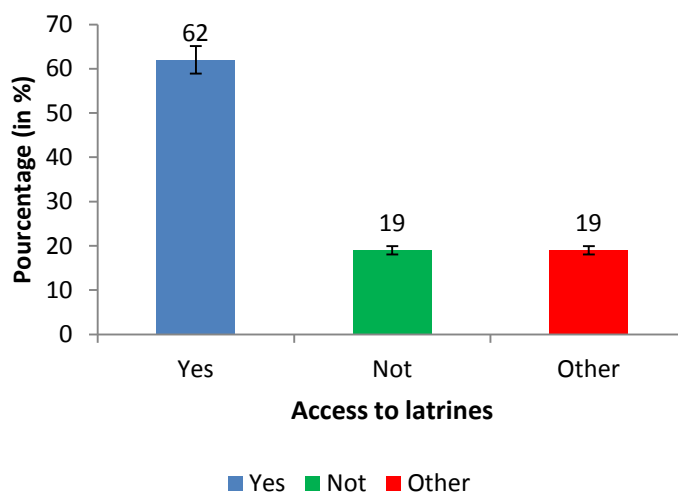


Figure 4: Access to latrines (in %).

It can be seen that 81% of households have latrines at home, whatever their condition, and 19% lack them. The majority of this proportion is attributed to riverside neighborhoods, notably Lokele Molua and Lokele Mongala.

#### Latrine construction

Latrine construction inputs were the focus of this study, and the results are shown in figure 5.

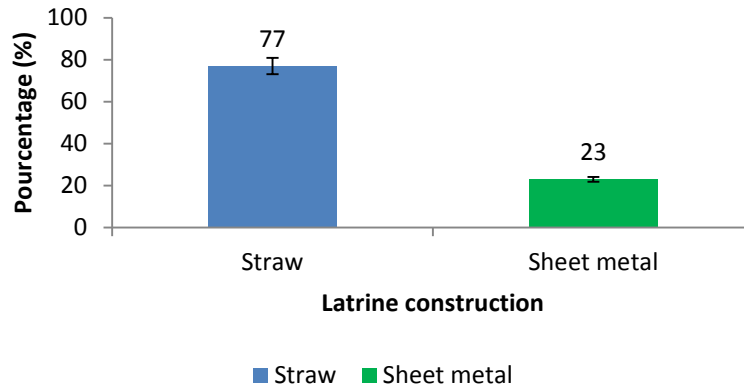


Figure 5: Latrine construction.

23% and 77% of households surveyed had latrines built from sheet metal and pebbles respectively. This situation shows that the lack of construction materials is one of the limiting factors in the acquisition of these inputs, given their income. Latrine type Figure 6 shows the situation with regard to latrine type in the town of Bumba.

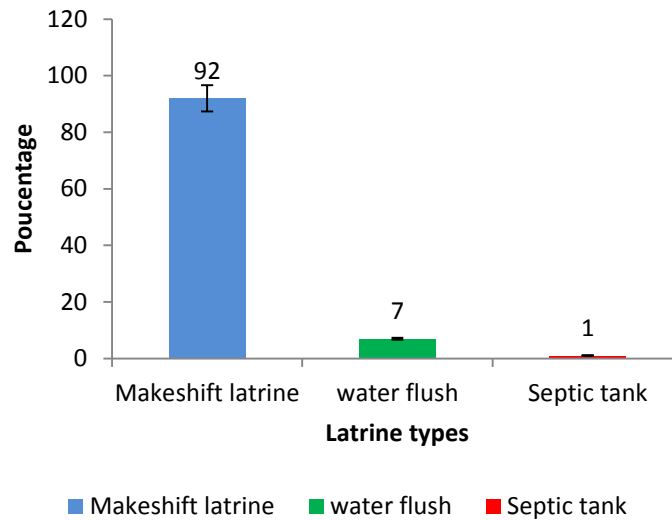
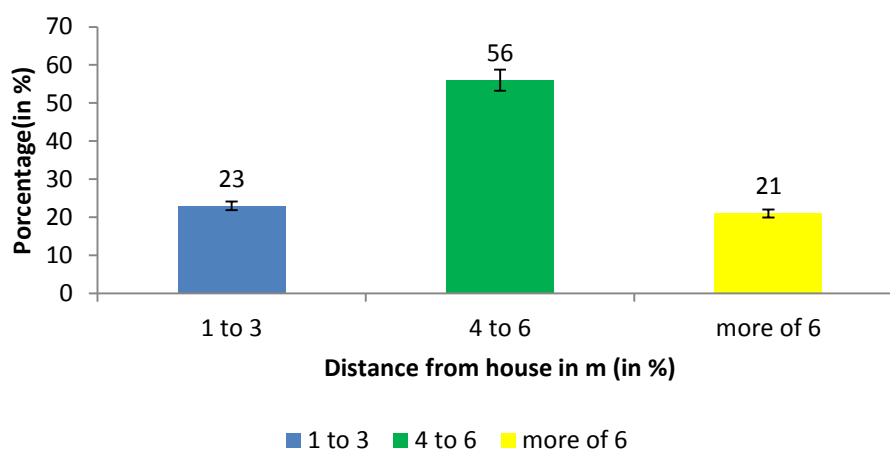


Figure 6: Latrine types.

We report that 92% of latrines are of the simple dry type, with 7% flush toilets and 1% septic tanks. These are certainly rudimentary facilities, but they do illustrate the level of hygiene insecurity in households. The following diagram illustrates this.

**Latrine distance from dwelling house**

The distance between the latrine and the dwelling house is shown in figure 7.

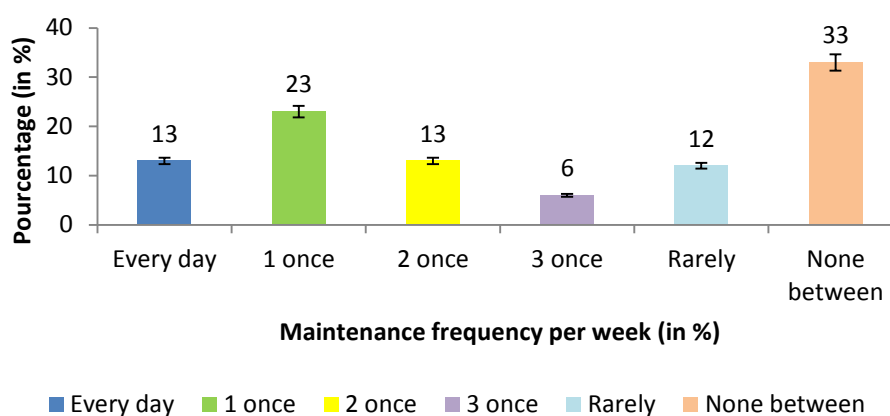


**Figure 7: Distance between latrine and dwelling house (in m).**

As for the distance between the latrine and the dwelling house, 21% of households have latrines more than 6 m from the dwelling house; 23% between 1 and 3 m; and 56% between 4 and 6 m from the dwelling house. This situation is justified by the contiguity of the plots in the housing estate and the difficulty of returning to the different latrine installation sites.

**Latrine maintenance frequency**

Figure 8 shows the frequency of latrine maintenance in the Bumba housing estate.

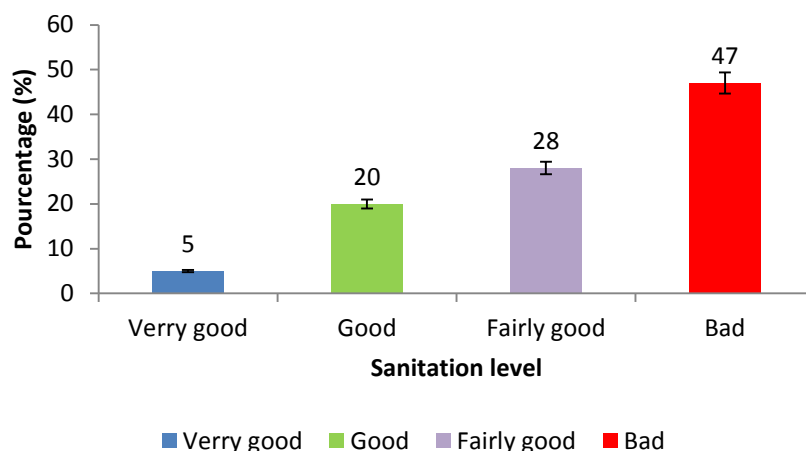


**Figure 8: Latrine maintenance.**

The issue of maintenance is central to the negative impact of latrines. There is a high threshold of 33% of households who rarely maintain their latrines, followed by 23% who maintain only once a week. And only 13% maintain their latrines every day. Given the large number of household members, it's unhealthy to have latrines that go untended for several days at a time. They become an ideal breeding ground for flies, and a hotbed for the development and spread of germs.

### Latrine sanitation in the city of Bumba

Latrine sanitation is shown in figure 9.



**Fig. 8: Latrine sanitation status.**

With regard to the sanitation of latrines, 47% of respondent households have latrines in a poor state of sanitation, compared with 2% of those with latrines in a very good state of sanitation in the city of Bumba. This situation shows that sanitation is a thorny problem in this part of the Republic.

### IV. Discussion

The present study used the sampling method to assess the problem of latrine use in the city of Bumba, and the analyses show the following. The average household size is 8 people. 81% of households have access to latrines, whatever their condition, and 19% have none. A very high rate given the size of the conurbation. The latter category relieve themselves in the water, at neighbors' homes or anywhere else. This is a major public health hazard, as it can spread germs.

The results reveal a paradox. On the one hand, for all sites except Ramonkodogo, over 50% of households with a latrine serve fewer than 10 people (whether traditional or improved). Given the relatively low coverage rate (see table 2), we can conclude that part of the problem lies in the under-utilization of existing structures. Thus, open defecation is practised not only by households without latrines, but also by some households with latrines.

The survey results show that 92% of households use simple dry latrines (pits), 7% have access to flush latrines and only 1% have a septic tank. This proportion is contrary to that found in the Mombele district of Kinshasa, where Kasongo et al. (2022) obtained 7.35% and 60% of households have traditional latrines and septic tanks.

Dube and Bassono (2012) note that the vast majority of latrines present in the villages sampled in Burkina Fasso are traditional latrines. For this reason, service levels range from basic to limited.

Most of the latrines in this city do not comply with the latrine conditions retained by Lomoyo (2014) such as the surface soil must not be contaminated, there must be no contamination of any groundwater likely to enter springs or wells, there must be no contamination of surface water, excreta must not be accessible to animals, especially flies, fresh excreta must not be handled; if handling becomes indispensable, it should be reduced to a strict minimum; odors and unclean aspects must be prevented; the installation adopted must be simple and inexpensive, of a construction as if for use; the installation must be culturally, economically accessible; the depth of excreta must be greater than 50 centimeters.

Non-compliance with these conditions is the cause of some of the most common diseases, in which fecal-oral water transmission plays a role: typhoid fever, cholera, bacillary and amoebic dysentery, helminthiasis, poliomyelitis and hepatitis A. The absence and/or non-compliance of latrines and poor sanitation represent a heavy health burden downstream, where endemic epidemics are more difficult to manage. Hospital care and logistics have to be made available, in addition to the high morbimortality that is also avoidable (Kasongo et al., op. cit).

With regard to the distance separating the latrine from the dwelling, 23% of latrines were found to be around 2 m from the dwelling, and 56% at 5 m. Distances that do not spare households from the ease of spreading germs if hygienic conditions are not met. However, according to Nikiema et al. (2011), the minimum

distance between the latrine and the building should be 6 m. Such a distance is a source of environmental pollution.

The situation shows that the urban-rural city of Bumba faces serious challenges in the management of solid and liquid faeces. With its exponentially growing population, despite no intervention from the government, there is a risk of a resurgence of disease among the population and the contamination of microbes that can be carried by excreta, as the problem of latrines is not taken seriously by households and the project to erect them is put on the back burner.

It has been observed that over 33% of households do not maintain their latrines in the city of Bumba; a paradoxical result at 72% of latrines surveyed are properly maintained in Burkina Faso (Carrasco et al., 2014).

## V. Conclusion

This study focused on the problem of latrines in the city of Bumba in the Democratic Republic of Congo. To achieve this, a survey was carried out between May and September 2022, covering 300 households in the six districts of the city of Bumba: Lokole, Lingode, Ndongo, Mobutu, Lokele Molua and Lokele Mongala. A software program, Kobocollect, was used to collect the data using a Smartphone.

The results suggest the following:

– 92% of households have simple dry latrines or traditional latrines, 7% have flush toilets and 1% have septic tanks.

– It was observed that 47% of respondent households have latrines in poor sanitary condition, compared with 2% of those in very good sanitary condition in Bumba.

– 79% of households have latrines less than 6 m from the house.

These results merit a call to the public health, hygiene and sanitation sectors to raise awareness in order to help households improve their solid and liquid faecal matter management techniques.

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