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THE CHALLENGES OFACHIEVING SUSTAINABLE DEVELOPMENT GOALS 3 AND 6 IN THE INFORMAL SETTLEMENT OF DOUALA IV, LITTORAL REGION OF CAMEROON

LES DÉFIS DE LA RÉALISATION DES OBJECTIFS DE DÉVELOPPEMENT DURABLE 3 ET 6 DANS LE QUARTIER INFORMEL DE DOUALA IV, RÉGION LITTORALE DU CAMEROUN

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Abstract

A large proportion of urban dwellers in sub-Saharan Africa reside in informal settlements, known for their poor living conditions and health problems. Many people in Douala IV have settled in slums where access to clean water and sanitation is quite difficult. This has exposed them to all kinds of hygiene and sanitation related diseases and has jeopardized the achievement of Sustainable Development Goals (SDGs) 3 and 6 on health, access to water, and sanitation also by 2030.The objective of this study was to analyze the challenges to achieving SDGs 3 and 6 in the informal settlement of Douala IV. As such, the methodology used mixed quantitative and qualitative research approaches. A random sampling technique was used to administer 330 questionnaires to 22% of the population. The results reveal that there is a problem with water accessibility, water availability, water quality, and water management in the informal settlement of Douala IV, resulting in 78.8% of the population being left to find for themselves about water and, as a result, people are forced to rely on well water, spring water, and borehole water which are not good for their health. Finally, the study concludes that the achievement of SDGs 3 and 6 faces many difficulties in the informal settlement of Douala IV and that there is no certainty that by 2030 any of these goals will be achieved. The study recommends that the government's planning of informal settlement and provision of water, infrastructure, and health services should include the population and involve them in all

development plans from conception design to implementation.

Keywords: Challenges, Sustainable Development goals, informal settlements, Douala IV.

Résumé

Une grande proportion de citadins en Afrique subsaharienne réside dans des quartiers à habitats informels, connus pour leurs mauvaises conditions de vie et leurs problèmes de santé. De nombreuses personnes à Douala IV se sont installées dans des bidonvilles où l'accès à l'eau potable et à l'assainissement est assez difficile. Cela les expose à toutes sortes de maladies liées à l'hygiène et à l'assainissement et compromet la réalisation des objectifs 3 et 6 du Développement Durable (ODD). L'objectif de cette étude est d'analyser les défis à surmonter pour atteindre les ODD 3 et 6 dans les quartiers à habitats précaires de l'arrondissement de Douala IV. Pour y parvenir, nous avons adopté respectivement les approches quantitative et qualitative de recherche. Une technique d'échantillonnage aléatoire a été utilisée pour administrer 330 questionnaires à 22% de la population de cet arrondissement. Les résultats révèlent qu'il existe un problème d'accessibilité et de disponibilité de l'eau potable dans les quartiers à habitats précaires de l'arrondissement de Douala IV. Conséquemment, 78,8% de la population est abandonnée à elle-même en ce qui concerne l'accès à l'eau potable et, incidemment, les populations sont obligées de dépendre de l'eau issue des puits et forages généralement impropres à la consommation. Enfin, l'étude conclut que l'atteinte des ODD 3 et 6 dans ce contexte n'est pas envisageable. Par conséquent l'implication active des pouvoirs publics dans la planification urbaine et la mise à disposition des populations d'une eau de qualité et d'un système d'assainissement adéquat doivent être prioritaire.

Mots clés : Enjeux, Objectifs de Développement Durable, habitats informels, Douala IV.

INTRODUCTION

Ensuring sufficient availability of water for human and environmental needs is one of today's most pressing global challenges. The demand for water for human consumption, sanitation, power, industry, agriculture and livestock, and other uses has accelerated more than twice as fast as the rate of population growth over the last century (United Nations, 2005; 2013). As a result, domestic water use has become the prime societal water need in both urban and rural areas. Household water supply has become an important public policy issue because safe water is mainly an essential component of primary health care. Access to improved water sources and sanitation is related to the health and survival of human capital (Mangyo, 2008; Tang et al, 2008; Mishra and Newhouse, 2009). Sub-Saharan Africa has been grappling with the issue of inadequate access to water and sanitation for decades (Sop, 2017). In the latest report, water comes after weapons of mass destruction, extreme weather events, and ahead of major natural disasters and climate change (World Economic Forum, 2018). The need to improve access to water and sanitation for men and women dates back to the 1977 United Nations Water Conference, the International Drinking Water and Sanitation Decade (1981-1990), the International Conference on Water and the Environment in Dublin (1992), also involved in the "Water for Life" decade (2005-2015), the Millennium Development Goals (MDGs), and The United Nations "2030 Agenda for Sustainable Development Goals". In September 2015, the United Nations Summit on Sustainable Development adopted a new framework to guide development efforts between 2015 and 2030, entitled "Transforming Our World: the 2030 Agenda for Sustainable Development" (United Nations, 2015). This 2030 Agenda contains 17 Sustainable Development Goals (SDGs) and 169 targets (United Nations, 2015). These 17 SDGs

are stated as follows: Goal 1: End poverty in all its forms everywhere; Goal 2: End hunger, ensure (achieve) food security and improved nutrition, and promote sustainable agriculture; Goal 3: Ensure healthy lives and promote well-being for all at all ages; Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; Goal 5: Ensure (achieve) gender equality and empower all women and girls; Goal 6: Ensure availability and sustainable management of water and sanitation for all; Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all; Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation; Goal 10: Reduce inequality within and among countries; Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable; Goal 12: Ensure sustainable consumption and production patterns; Goal 13: Take urgent action to address (combat) climate change and its impacts; Goal 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development; Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation, and halt biodiversity loss; Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels and Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

Nevertheless, the purpose of this study focused on Goals 3 and 6. It is important to notify that there is a close link between SDGs 3 and 6, for instance, poor hygiene and sanitation lead to poor health, and poor unsecured housing also leads to poor health. Thus, ensuring the success of one of these goals indirectly ensures the success of the other two (United Nations, 2015). SDG 3 is a multiple and universal resource on which sustainable development policies can build especially for countries that need it the most and can lead to the sustainable maintenance of well-being and health. However, SDG 3 faces a strong sectorization, so there is a risk of not being able to achieve the goals set. Health and wellness for all people are universal rights that, together with education, are arguably the best civilization tool to build harmonious, equitable, and just sustainable development (Guégan et al., 2018). In the same light, the establishment of SDG 6, to ensure the availability and sustainable management of water and sanitation for all, reflects the increased attention to water and sanitation issues on the global political agenda (UN-WATER, 2018). Nevertheless, UNICEF and WHO estimate that 1.1 billion people lack access to improved water supplies and 2.6 billion people lack adequate sanitation. Providing safe drinking water and basic sanitation to achieve the MDGs will require substantial economic resources, sustainable technological solutions, and courageous political will (Moe and Rheingans, 2006). According to the experts of the UNFPA (2004), population growth is one of the principal causes of the increase in the needs as regards housing, water, hygiene, energy, health care, education, social services, food, and difficulties of durable sanitation (Sadik, 1994). In urban areas, especially in informal settlements, the provision of adequate water and sanitation services is extremely difficult in poor countries. Unsafe water and poor sanitation are major causes of morbidity and mortality, especially among young children living in poor urban informal settlements. Many people living in the informal settlement are unable to maintain adequate domestic hygiene or are unaware of health risks. Sanitation issues (such as the lack of proper waste disposal methods) are the cause of dozens of deadly contagious diseases, many of which are particularly prevalent among children,

where running water and sewage systems are often limited and garbage collection is rare. These conditions do not only affect the people who live there; their effects also influence the rest of the city.

Although rich in natural resources, Cameroon lags behind the rest of the world on several indicators of social well-being. According to the 2016 Human Development Index (HDI) report published by the United Nations Development Program (UNDP), Cameroon falls into the category of low human development countries in the world. Indeed, the country is ranked 153rdin the world, out of 188 countries surveyed, and 23rdin Africa. More than half of the population suffers from poverty, including poor education and health, and a low standard of living.

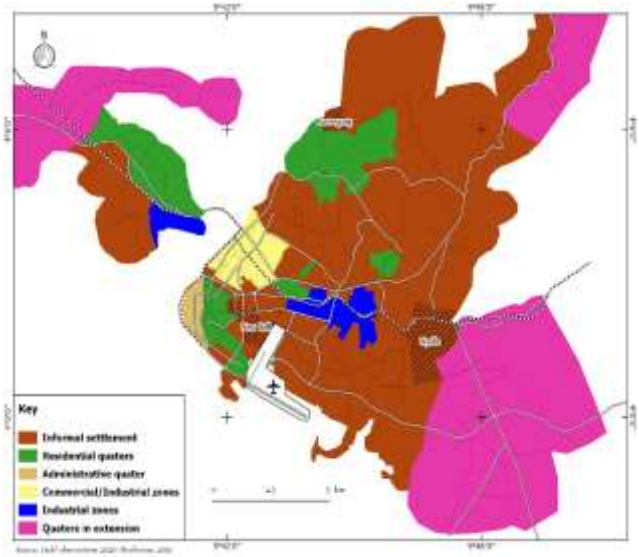
Douala IV, the economic capital of Cameroon, attracts many people, including young people from all parts of the country and neighboring countries, in search of better opportunities. This has resulted in significant population growth, with an estimated average annual population growth rate of 5% over the past 30 years, well above the national rate of 2.8%. At this rate, the population of Douala IV is expected to triple by 2035. Low levels of access to sanitation coupled with high vulnerability to flooding pose enormous health risks to the population of Douala IV (Sop, 2017). In Douala IV informal settlements, unclean water, poor hygiene, and sanitation are major causes of morbidity and mortality mostly among children. Based on the issues raised above, the research question for this study is: what are the challenges to achieving SDGs 3 and 6 in the informal settlement of Douala IV?

1. MATERIALS AND METHODS

1.1. Location of the study area

Located in the inter-tropical zone in the Gulf of Guinea in the Wouri estuary between latitudes 04°03’ and 04°9’ north and longitudes 09°34’ and 9°45’ east, Douala IV enjoys a humid tropical climate. Annual rainfall is over 4,000 mm, characterized by wet and dry seasons with temperatures ranging between 24 and 27°C. Douala IV is bordered to the north by the Mungo and Nkam divisions, to the east by Douala IV I, to the south by the Atlantic Ocean, and to the west by the South West Region of Cameroon.

Map 1: Geographic location of the study area



Source: Fieldwork, 2020

1.2. Data collection and management

This study used a descriptive research design; it attempts to establish a cause-and-effect relationship among the variables used in this research. Data were obtained through questionnaires administered to the population of Nyalla, New-Bell, and Boanangang to obtain information on their opinions regarding the challenges they face in their communities concerning achieving SDGs 3, and 6. In-depth interviews were conducted with the relevant authorities in charge of urban planning in Douala IV. Data on the health of the population were also obtained from four health institutions: the first in Boanangang, the second in Nyalla, and the third and fourth in New Bell. Water samples were collected from household wells and analyzed at the laboratory of the Wastewater Research Unit of the Faculty of Science of the University of Yaoundé I to assess water quality in the informal settlement of Douala IV. To determine the sample size for each quarter, a certain percentage of respondents was obtained from the 261,407 (Douala IV) plus 646,347 (Douala IV) and 544,019 (Douala IV) for a total of 1,452,673 people. 10% of the target population was the sample size used for this research. Therefore, the sample size = 0.1x 1,452,673= 145,267.3. Using a random sampling technique, 330 questionnaires were administered to the target population living in the selected area in an informal settlement in Douala IV. The collected data were entered into a spreadsheet using the Statistical Package for the Social Sciences (SPSS) version 21. Both descriptive and inferential statistical methods were employed in this analysis.

1.3. Ethical approval

The protocol for this study was independently reviewed and approved by the University of Bamenda Ethics Committee. Informed consent was obtained from all participants included in the analysis. They were then invited to voluntarily participate in this research. They were informed that the study was confidential and that their participation will not affect their care. The agreement was materialized by the signing of the informed consent form.

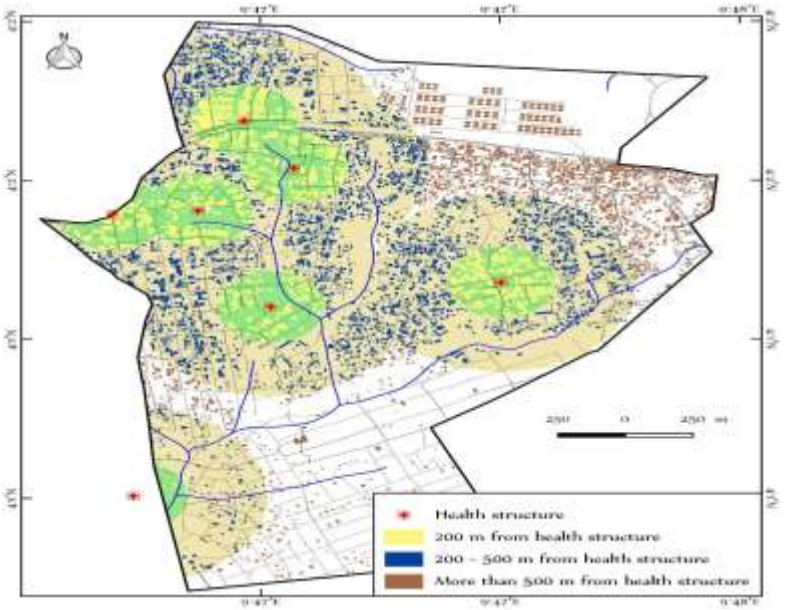
2. RESULTS

2.1. Physical accessibility to the health institution in the informal settlement of Douala IV

Goal 3 of the UN SDGs is to ensure healthy lives and promote well-being for all of all ages. The target of item 3.4 of SDG 3 by 2030 is to reduce premature mortality from non-communicable diseases by one-third through prevention and treatment and to promote mental health and well-being. Achieving the goal of good health and well-being in urban areas of poor countries appears to face serious challenges. In the informal settlement of Douala IV, the challenge seems greater due to the level of poverty of its population.

The proximity of health facilities is a great advantage for the health of the population. Closeness to the health institution will significantly reduce the death rate, lower the cost of going to a health center, and motivate people to go to the hospital when they are sick. Map 2 presents the physical accessibility to healthcare units in the study area.

Map 2: Accessibility to healthcare institutions in the informal settlement of Douala IV



Source: Fieldwork, 2020

According to map 2, most residents of the informal settlement of Douala IV travel more than half a kilometer (500m) before reaching health institutions. This constitutes a restriction to the dimension of healthcare accessibility based on physical distance. The health facilities located at the shortest distance (200m) are those of low quality and the population's demand is greater than the availability of these services in these facilities. This difficulty of distance given the high doctor-to-patient ratio is a constraint to achieving the healthcare-related SDGs by 2030.

2.2. Staying away (abstention) from healthcare facilities and self-medication

People react differently to health problems depending on their financial capacity. In the informal settlement of Douala IV, some people resort to self-medication, and others turn to the hospital when they have a health problem, each according to their financial power. But the vast majority turn to the hospital when the health situation is critical. Moreover, many people are responsible for their hospital bills; very few have health assurance because very few are government workers (civil servants). The field report shows that more than half of the population has had a case of illness in their home in the last three months. 51% of the population agrees that either they or someone in their household has felt sick in the last three months and 49% disagree. People use a variety of means to care for themselves when they are sick. Table 1 presents the reality of the informal settlement in Douala IV.

Table 1: Methods of treatment by respondents in an informal settlement of Douala IV

Methods of treatment	Frequency	Percentages (%)
Nothing	5	2
Self-medication	101	46
go to the hospital	55	25

Source: Fieldwork, (2020)

When faced with illness, 2% of the people do nothing when they are sick, 46% treat themselves (self-medication), 25% go to the hospital, and

26% turn to other means, like visits to native doctors or herbalists. The percentage of those who go to the hospital is really low, which means that the health situation of the population in the informal settlement of Douala IV is in danger, and if nothing is done, SDG3 will not be achieved here by 2030. Among the poor, many people often take the time to observe the patient for two or three days before taking him to the hospital, due to lack of money. In the informal settlement of Douala IV, many people take their patients to the hospital when the case is bigger than theirs. Table 2 shows how people in the informal settlement of Douala IV behave in case of illness. Field statistics reveal that 29% of respondents go to the hospital at the very beginning of the illness, 21% when the illness is not yet too severe, 41% when the illness is severe, and 9% go to the hospital when the illness is very severe. So, in general, people always try to manage the patient at home and refer him to the hospital when the case is out of control. In the commune (municipality) of Douala IV, people have various reasons for not doing anything to treat themselves when they are sick. But at the heart of all these reasons is the lack of money (table 2).

Table 2: Reason why people don't do anything to treat themselves when they are sick

Reason	Frequencies	Percentages (%)
Sickness is not too serious	36	13
Lack of money	218	77
You do not know the treatment for this sickness	3	1
The health center is too far from your home	24	9

Source: Fieldwork, (2020)

According to table 2, 13% answered that it is because the illness is not too serious, 77% said it is because of lack of money, 1% answered that they do not know what to do, and 9% that the health center is too far. Lack of money is therefore the main reason why people do nothing to treat themselves when they are sick in the informal settlement of Douala IV. The SDGs are far from being achieved in the informal settlement of Douala IV considering this indicator.

Most people choose to self-medicate in the informal settlement of Douala IV. Self-medication is the primary means of treatment that people turn to in the context of poverty. It is cheap and available because it is done through the use of grass or the backs of trees. Table 3 reveals the reason why people choose self-medication in the informal settlement of Douala IV.

Table 3: Reasons why people choose self-medication in the informal settlement of Douala IV

Reason	Frequencies	Percentages (%)
Lack of money for consultation	225	76
Cheap	56	19
The health center is too far from your home	16	5

Source: Fieldwork, (2020)

Table 3 reveals that 76% of the population said they choose self-medication because of lack of money, 19% said because it is cheap, and 5% gave the distance to the health facility as the reason for choosing self-medication. The Cameroonian government has banned the practice of buying medicine at the roadside. But in the informal settlement of Douala IV, people are far from this reality (table 4).

Table 4: Places where the population buys their drugs

Places where drugs are bought	Frequencies	Percentages (%)
On the street	56	39
In the pharmacy	77	53
Given by a relative	12	9

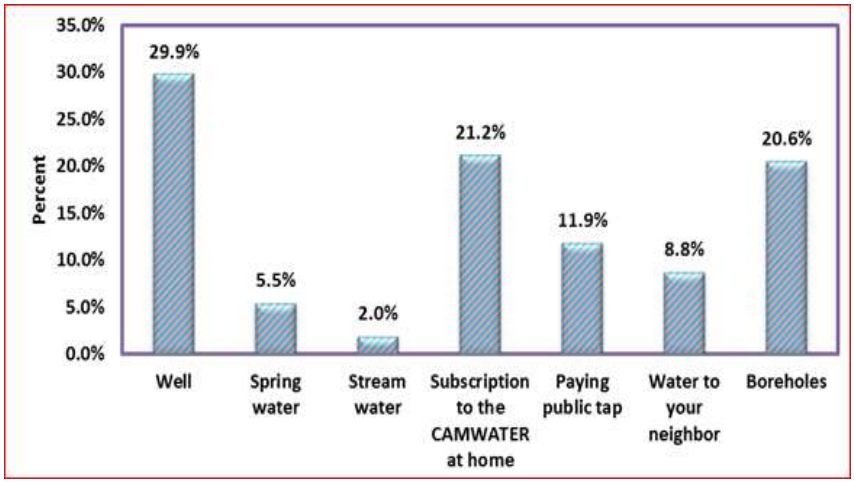
Source: Fieldwork, (2020)

Table 4 shows that 39% of the inhabitants of the informal settlement of Douala IV buy their medicines in the streets, 53% in pharmacies and9% were given by relatives. Although the percentage of those who purchase medicines in Pharmacies is encouraging, a good number of people (39%) continue to buy them on the street, which is dangerous for their health.

2.3. Water sources in the informal settlement of Douala IV

In the informal settlement of Douala IV municipality, people collect water from different sources and for various uses. Some collect water from taps, wells, springs, or boreholes, which are often privately owned (figure 1). In this commune, the population, often poor, relies primarily on well water for domestic use. They struggle to buy water from borehole owners to drink, with 20 liters costing 50 CFA francs. The price alone shows that water is not at the level of the common man, so they use the well water for their domestic work and only buy the water they are going to drink.

Figure 1: Water sources in the informal settlement of Douala IV



Source: Fieldwork, 2020

The results show that 29.9% of the population in the study area obtains its water from wells, 5.5% from springs, 2.0% from streams, 21.2% subscribes to Cameroon Water Utilities Corporation (CAMWATER) at home, 11.9% rely on public taps for their water consumption, 8.8% fetch water from their neighbors, and 20.6% rely on water from boreholes. Less population in the informal settlement of Douala IV is connected to CAMWATER. Generally speaking, CAMWATER is supposed to be the most reliable source of water for consumption that is not harmful to the health of the population. But if what is good for the health of the population is not available at all or is limited to a selected few, the rest of the population will be forced to turn to what is available and, in so doing, expose themselves to all kinds of diseases. Wells are the main source of water supply for the population in the study area. These boreholes (wells) vary in quality as shown in plate 1.

Plate 1: Differences in borehole quality in the informal settlement of Douala IV

Source: Fieldwork (2020)

The population in the informal settlement of Douala IV is at risk if nothing is done to improve their access to a safe water source. The fact that the largest source of water in the informal settlement of Douala IV is a well rather than taps, which have a high level of sanitation; is evidence that the population has poorer and unsustainable water sources. This has further exposed the population to water-borne diseases. All of this has led to challenges in achieving the SDGs related to accessibility to safe drinking water, healthcare, and safe cities. Based on this analysis, the study area is not safe and resilient, which poses a challenge for SDG 6.

2.4. Water accessibility in the informal settlement of Douala IV

The challenges to achieving the SDGs are very significant with water accessibility in the informal settlement of Douala IV. Water accessibility is the ease with which water can be obtained from the various sources in the area. It is considered in terms of dimensions of water accessibility, such as physical, economic, and social accessibility, as presented in Table 5.

Table 5: Dimensions and indicators of water accessibility in the informal settlement of Douala IV

Dimensions	Indicators	Situation in Douala informal settlement
Physical	Distance covered	Most of the inhabitants travel long distances to get potable water
Economic	Cost of buying water	High water bills, high cost of connection, long queues to pay bills
Social	Availability and quality of water	Poor mindset on water facilities, poor quality water, most of the water is not clean.

Source: Fieldwork, (2020)

The results in Table 5 show that with all dimensions of water accessibility in the study area, the indicators were not met. Most of the applicable indicators in the informal settlement of Douala IV show that there is a dismal high performance in the achievement and attainment of water accessibility indicators in the study area. Field data indicate that the distance between the house and the water collection point is a major challenge in achieving SDG 6 in Douala IV (table6).

Table 6: Distance covered between homes and water collection point

Water source	Average distance (km)
Well	50m
Spring water	200m
Stream water	200m

Water source	Average distance (km)
CAMWATER stands	At home
Public tap	150m
Boreholes	200m

Source: Fieldwork, (2020)

Table 6 shows that people do not have direct physical access to water in the study area. People travel to other locations far from their homes to obtain water. This aspect of physical accessibility, which is distance shows that since the inhabitants do not have water at home, SDG 6 is far from being achieved. According to the population, 49% of the inhabitants walk and cover long distances to obtain drinking water. CAMWATER is the best and safest source of water after an investigation in the study area. Also, 61% of the respondents in the informal settlement of Douala IV do not have drinking water available in their homes. This challenge is based on the fact that the water supply actors are not able to respond to the water supply given the uncontrolled population growth and housing expansion in the informal settlement of Douala IV. The study therefore, predicts that this limited access to water is already a challenge to SDG 6, which may not be met by 2030. The study determined the number of people connected to CAMWATER standpipes and made projections as shown in Table 7.

Table 7: Distribution of the number of people connected to CAMWATER in the informal settlement of Douala IV

Quarter	Total population in 2020	Number of people connected to CAMWATER in 2020	Balance of the number of people presently without good water sources in 2020
Nyalla	261,407	4,000	257,407
Bonangang	646,347	1,708	644,539
New-Bell	544,919	7,109	537,810
Total	1,452,673	12,817	143,9756

Source: Calculations projected from CAMWATER statistics (2020)

Based on table 7, the population of the study area is disproportionately larger than the number of people with the most preferable quality water source in the study area.

The population projection in 2030, was made using the formula Po=P1 (GR+1) n, where Po=current population, P1= previous population, GR= growth rate, and n= number of years. Thus, the projected population in 2030 will be 1,588,478 and projecting the number of people who will be connected to good water sources by 2030 stands at 17,943 individuals. Therefore, 1,581,046 citizens of Douala IV will not subscribe to CAMWATER, compared to 1,447,365 people in 2020 in this area, in 2030. This means that 135,805 people will have been added to the population in2030. Insufficient water exposes people to dirt and therefore to diseases. This distance challenge, if not addressed, will be a challenge to achieving the SDGs.

2.5. Water quality in Douala IV

Table 8 shows the results of laboratory analyses of the physicochemical parameters of water from wells and boreholes in the area of study.

Table 8: Physicochemical and bacteriological analysis of boreholes and well water in the study area (Douala IV)

	NYALLA		**NEW-BELL**		**BONANGANG**		
Para-meter	Borehole (forage)	Well (puit)	Borehole (forage)	Well (puit)	Borehole (forage)	Well (puit)	Stan-dard of WHO
Hydrogen potential (pH)	5	7.3	4.1	6.9	4.8	7	6,5-8,5
Conductivity	118	530	125	587	115	511	400µS / Cm
Temperature	27	27	26	28	26	27.5	< 25°c
Nitrates	0.6	4	0.9	4.7	0.5	4	< 44 mg/l
Fecal- strepto Cocci	27	78	29	82	33	91	0 UFC/ 100ml
Fecal coliforms	71	372	65	212	51	301	0 UFC/ 100ml

Source: Fieldwork, (2020)

From the above table 8, it can be seen that according to WHO (2005), the normal hydrogen potential (pH) is 6.5 and 8.5, water conductivity is 400µm, temperature < 25°C, water nitrate <44mg/l, fecal streptococcus 0 UFC/100 ml, and fecalcoliform0UFC/100 ml.

The temperature values of the sampled water are between 26 and 28°C. They do not comply with WHO (2005) standards, which recommend a temperature below 25°C for drinking water.

The physicochemical lab results (Table 8) show that the PH of the analyzed water points from the well respects the standard set by WHO (2005), which is 6.5 to 8.5, while the water from the boreholes does not. Conductivity is proportional to the degree of mineralization and varies according to temperature: it is more important when the temperature increases. Conductivity, as such, has no direct effect on health, as it reflects all the dissolved minerals. Mineralization can lead to a salty taste in some cases. However, conductivity is one of the means of validating physicochemical analyzes.

In the areas studied in the city of Douala IV, the conductivity values of the water from the Nyalla, New-Bell, Kassalafan, and Bonamoussadi boreholes meet the standards recommended by WHO and the EU (400µS/Cm). Conductivity values for these wells range from 115 to 125µS/Cm. However, the wells sampled at New Bell (Kassalafan), Nyalla, and Bonamoussadi (Bonangang) have conductivity values between 511 and 587 µS/Cm. The ingestion of nitrate is a potential risk factor for human health. They are present in surface water at a rate of 0.03 to 1 mg/l. At the end of the treatment facilities, their value must be lower than 0.1 mg/l. For drinking water, the accepted quality limit is between 50 and 100 mg/l, except for pregnant women and infants. The ingestion of nitrates in high doses is likely, under certain conditions, to disrupt blood oxygenation in infants. Moreover, they are suspected of participating in the development of digestive cancers. Above 100 mg/l, water should not be consumed. These salts are transformed in the body into nitric acid (HNO3). These reactions are due to the difference between the pH of the natural environment (water) and the pH of the body. The results also indicate the presence of nitrates without danger for the populations in the water of the analyzed boreholes and wells because their contents are well lower than the standards recommended by WHO (<44 mg/l). These nitrates come from the decomposition of organic matter, notably from the uncontrolled discharge of solid waste.

Also, the water from the wells and boreholes studied has an unevenly high concentration of fecal streptococci. The mere presence of fecal

coliforms and fecal streptococci in the water automatically makes it unfit for human consumption according to the drinking water standards recommended by the WHO. By deduction, they contaminate the water of wells and springs used by the populations by the phenomenon of leaching of pathogenic germs and pollutants coming from the innumerable surrounding waste. Factors explaining the spatial differentiation of results include the geographical position of water points (plain, mid-slope, and summit), the density of the built environment, the level of maintenance of water points, and the presence of various types of waste, etc.

2.6. Hygiene and sanitation in the informal settlement of Douala IV

The hygiene and sanitation situation in the informal settlement of Douala IV is often very poor due to the unplanned growth of the population. The population faces daily poor waste management and a lack to access to public toilets.

2.7. Waste management in the informal settlement of Douala IV

As an urban area grows, so does the amount of waste. People eat every day and must have some way to dispose of their waste. But waste management is quite poor in urban centers and even worse in informal settlements. In the informal settlement, no planning has been done and no means of waste disposal has been provided, so everyone does their best to get rid of their waste. In planned urban centers, the government places public garbage cans at the roadside to facilitate waste management. In the informal settlement of Douala IV, people often rely on Hygiène et Salubrité du Cameroun (HYSACAM) to come by once or twice a week. When it is not available, people develop other means to dispose of their waste. This situation reveals the fact that in the informal settlement of Douala IV, hygiene and sanitation conditions are poor. Plate 2 shows the poorly disposed waste piles in the study area.

Plate 2: Piles of improperly disposed waste in the informal settlement of Douala IV

Source: Fieldwork, (2020)

A and B: waste dumped along houses and D waste dumped in the gutter and rivers. Photos C and D. This is a major challenge for SGDs because waste disposal and management are still weak in this area.

2.8. Types of toilets in different households in the informal settlement of Douala IV

The type of toilet reveals the socio-economic condition of the people. When people are financially viable, they often build their houses with modern toilets. But when financial means are limited, they build traditional toilets. For those who can afford it, they build both types of toilets, mainly to solve the problem of the water crisis. In the informal settlement of Douala IV, a large number of people often have traditional toilets (Table 9).

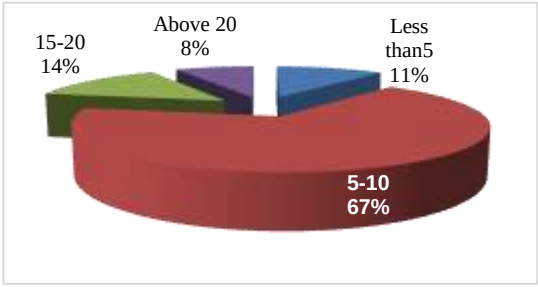
Table 9: Category of toilets in the different homes in the informal settlement of Douala IV

Type of toilet	Frequency	Percentage (%)
Modern	101	38
Traditional.	164	62
Total	324	100

Source: Fieldwork, 2020

According to table 9, 38% of respondents have modern toilets in their homes, while 62% have traditional toilets. The spread of communicable diseases is easier when people share toilets with others. It is limited to cases where people use their toilets alone. But poverty forces some people in the informal settlement of Douala IV to build one toilet to be used by all their tenants. Thus, 10 or 20people may share the same toilet and even the same bucket. 35% of the inhabitants of the informal settlement of Douala IV share their toilets with their neighbors, compared to 65% who do not. This effect is high and may promote the spread of diseases among the population of the informal settlement of Douala IV. Many people in the informal settlement of Douala IV share their toilets with a large number of people (Figure 2).

Figure 2: Number of people sharing toilet



Source: Fieldwork, 2020

According to figure 2, 4,11% of people share a toilet with 5-10 people, 67% share with 10-15 people, 14% share with 15-20 people, and finally, 8% share with more than 20 people. These results show that the hygiene conditions in the informal settlement of Douala IV are really bad. Many more people are exposed to contagious diseases.

3. DISCUSSION

The overall objective of the study was to examine the challenges to achieving sustainable Development Goals 3 and 6 in the informal settlement of Douala IV. The analysis of the results and their interpretation reveal that the water from wells and boreholes consumed by the population of Bonangang, Nyala 2, and

New-Bell is not potable (drinkable). According to WHO (2005), the normal hydrogen potential in water is 6.5 and 8.5, the conductivity of water is supposed to be 400µm, the temperature < 25°C, the nitrate of water <44mg/l, the fecal streptococcus 0 UFC/100 ml, and the fecal coliform0UFC/100 ml. When all these conditions are met, the water is safe to drink. The conclusion of the analyzed water samples from the study area is that the analyzed groundwater samples cannot be consumed directly by humans due to the presence of microbiological germs showing that the water has been polluted by fecal matter with concentrations higher than normal and does not possess the quality of water for human consumption (UN-Water, 2018). It is worth highlighting here the fact that the population of the study area does not drink the water from the well for those who do not have access to CAMWATER, but they use it for cooking, bathing, washing dresses and dishes, and mopping their floor. The study revealed that in terms of accessibility, availability, quality, and management of drinking water, the populations of the informal settlement of Douala IV are facing many difficulties. Indeed, the results show that only 21.2% of the population of the study area is connected to the national water supply (CAMWTER). The rest,78.8%, depends on a well, spring, river, or borehole to meet their water consumption needs. It should also be stressed that the mal-urbanization characterized mainly by the anarchic construction of housing does not favor the establishment of a water supply network in conformity with the urban planning regulations, nor the systematic servicing of all real estate properties and therefore, all households (Ngouh et al.,2021). Regarding waste management, only 22% of the population in the study area throw their waste in a public garbage can, either when the HYSACAM passes by (and it often does so after one or two weeks, especially on Saturdays), or on a gutter for 53% of the population, and the rest throw it in a river or on their farm. They are stored in bags at home or on the roadside and wait there for a few days. There is no exciting specific structure defining the sanitation policy in urban areas in Cameroon, i.e. design, construction, management and maintenance of works, discharge standards, etc. (Assako Assako. et al., 2005; Assako Assako, 2006). To this end, it is important to reorient and better define this legislation by taking into account individual or group representations and behaviors (Assako Assako et al., 2005). Besides, there is an urgent need to educate the dwellers of Douala IV about water quality in their area. According to Djuissi Tekam et al (2019), the need to educate and raise awareness among the population about the quality of water distributed by CAMWATER and the benefits of safe drinking water is vital. Also, wastewater that is discharged into the wild or stagnant gullies in concessions is evidence of continuous and permanent environmental degradation that will strongly support the use of sound approaches to improve sanitation coverage through affordable, efficient, and environmentally friendly technologies. Given the challenges of achieving Sustainable Development Goals 3 and 6 in the informal settlement of Douala IV, it is probably impossible for any of these goals

to be achieved by 2030. Indeed, due to poverty, the population lacks access to clean water, safe housing and health, and hygiene and sanitation conditions in the area are really bad. Their well-being is at risk (jeopardized). Here, people are surviving while they have not yet started to live. Insufficient access to safe drinking water and inadequate sanitation has serious consequences for human health. It also exacerbates poverty and hinders development. The issue of urban planning, hygiene and sanitation, health and well-being in Douala informal settlement is a real call of concern. Therefore, the SDGs 3 and6 in Douala IV is so far from being achieved by 2030.

CONCLUSION

This study shows that there is a problem with water accessibility, water availability, water quality, and water management in the informal settlement of Douala IV, forcing the population to rely on well water, spring water, and borehole water. It was revealed that most residents of the informal settlement of Douala IV travel more than half a kilometer (500m) before reaching health institutions, which constitutes a restriction to the dimension of healthcare accessibility based on physical distance. Therefore, Self-medication is the primary means of treatment that people turn to in the context of restriction to the dimension of healthcare accessibility and poverty. It resulted also from the physiochemical and bacteriological analyses of water quality used by household in Douala IV are below the standards set by WHO which are not good for their health. The state of hygiene in the study area is also challenging. Therefore, to achieve the sustainable development goals 3 and 6 in the informal settlement of Douala IV, the government's planning of informal settlement and provision of water, infrastructure, and health services should include the population and involve them in all development plans from conception design to implementation..

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