WATER AND WELLBEING GOVERNANCE OF BERTOUA DWELLERS: CASE STUDY; BERTOUA 1ER AND BERTOUA 2E COUNCIL

ADE

EAST REGION BERTOUA

GLOBAL GREENGRANTS FUND

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This research report is not intended to establish any offence for the purposes of prosecution; it has been drafted with the sole aim of providing a solid database for advocacy for the access of all to drinking water in Bertoua. The prerogatives of recording offences are recognised only to the prosecutor, to judicial police officers with general powers, and to sworn agents of the administration in charge of water, health and the environment, as provided for in article 19-1 of law no. 98-005 of 14 April 1998 on the water regime.

ADE

SUMMARY

RESUME

Trust more than money, today is the main need to bridge the gap between a limited professional technical offer for the wealthiest and the demand for drinking water supply for the poor. Portable water supply systems in the East seem selective due to water property microbiological-analysis-related charges, connection to public portable water supply networks, the creation and maintenance of springs, wells and water boreholes with human-powered pumps. This report presents major investigation outputs carried out in Bertoua during the State's transfer of competence regarding drinking water supply. It aims at presenting Bertoua dwellers' daily challenges in accessing drinking water and the governance of water resources to assess the challenges they face. Several projects have been carried out in Bertoua to solve the increasing demand and the unsatisfactory supply of drinking water. An example is the enhancement and extension project of the Bertoua drinking water supply system. Financed in 2017 at 15.8 billion CFAF by the Cameroonian government in collaboration with the French Development Agency (AFD) and the European Bank for Reconstruction and Development (EBRD), this project was presented as the solution to supply drinking water to 92 000 people. The implementation result of this project being incomplete, added to that the lack of human, material as well as financial resources in Decentralised Territorial Collectivities (DTCs) has resulted in the consumption, by Bertoua dwellers, of water not complying with current (WHO) standards , many waterborne diseases and a feeling of exclusion. These facts greatly query the governance efficiency as concerns water in Bertoua.

Key words: Drinking water, supply, demand, water governance, rich, poor, exclusion.

INTRODUCTION

Today, natural resources, which ought to serve the well-being of the population suffer from inefficient management policies. Of all natural resources, water is the one with challenges linked to its delicate and depletable nature. Water is an essential resource to man's survival as it is part and parcel of the latter's daily life in feeding, menstrual and body hygiene, house chores and trade. Access to drinking water is essential to health and is a basic human right and a key element of effective health protection policies (SOKEGBE, 2017). The absence and/or bad water quality may cause many waterborne diseases (Lagnika and al., 2014) According to WHO and UNICEF 2015 data on Sub-Saharan Africa, 32% of the population don't have access to potable water and 70% don't have an adequate sanitation system. According to Darmane and Potter (2009), the solution to drinking water access-related problems lies in public awareness and the responsibility of actors concerned (municipalities and private sector...) Indeed, uncontrolled urban planning and poor hygiene practices are factors that raise sanitary risks at water points (Ntep and al.,2014) and this situation sufficiently depicts the need for collaboration between citizens and local authorities for a sustainable drinking water supply process.

Access to drinking water is considered as a development priority in Cameroon. The country's Growth and Employment Strategy Paper (GESP) lists access to drinking water and sanitation as key and essential to growth goals, wealth creation and the fight against poverty. Cameroon has the required natural conditions by reason of its numerous water resources. Meanwhile, household water supply is still insufficient in many cities. This is true with Bertoua where the population deplores the inaccessibility of drinking water. According to the newspaper, Ecomatin, July 4th , 2021, release titled "Eau et assainissement : le calvaire des populations de l'Est" 5 out of the 33 administrative units are supplied with drinking water by Camwater and these cities were supplied with water only at 40% in 2021. The 28 other administrative units have deployed considerable efforts to satisfy their primary water needs.

In view of enhancing the service quality and the access to drinking water, the government and development partners have undertaken and implemented several initiatives. Among these initiatives is the rehabilitation, reinforcement and extension of the Bertoua drinking water supply system. It was financed in 2017 to the tune of 15,8 billion CFAF by Cameroonian government,the French Development Agency (AFD) and the European Bank for Reconstruction and Development (EBRD) According to the Ministry of Water Resources and Energy (MINEE), this project was to supply water to 92 000 people in Bertoua with water.

PROBLEM :

Water governance is a way out , that which promotes sustainable, integrated, inclusive and affordable drinking water access to all. Presented to promote the access of 92 000 people to drinking water, the rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system and the budget allocated to DTC for water supply in areas not covered by the Camwater are a basement to assess water governance in Bertoua in view of the persistent difficulties relative to drinking water access. If the State, to ensure development, performance and responsibility from some water actors transferred its competences as regards drinking water supply,it is clear that there are still difficulties linked to the enjoyment of a number of rights like the right to access drinking water and the right to health.

Who are these actors and what is their role? What are the challenges they encounter? Do the dwellers of Bertoua have access to drinking water? Is water supply selective? Is water governance in the East effective and efficient?

OBJECTIVE

Water is life and it is essential to the existence of all living things. The United Nations has made universal access to healthy drinking water the (6th) Sustainable Development Goal so as to ensure a sustainable management of this resource and a universal and equal access to drinking water for all by 2030 especially for vulnerable populations.

This research in the Lom and Djerem division aims to assess the impact of water governance on the health and well-being of the Bertoua population, its efficiency considering the context and the expectations of the population.

That is:

- Collect and analyse a sample of a public water network.
- Determine the role of each party involved in water governance in the East region.
- Map drinking water access-related challenges.
- Assess drinking water governance in the East region.
- Suggest tangible measures to improve water governance in Bertoua.

METHODOLOGY AND ANALYSIS EQUIPMENT

The methodology used for this research was wide-ranging and comprised four (4) complementary and integrated stages, including sampling and analysing a sample of water from the public network, documentary research, field surveys and analysis of the data collected.

• The gathering and analysis of the public network water sample aim to ensure that the water distributed to the Bertoua population complies with the standards laid down by the World Health Organisation (WHO). A water sample was sampled in the Bertoua 1er subdivision at the Judicial Police Station, for analysis. This sample was made according to the procedures laid down by the Centre Pasteur du Cameroun, which prescribed the water sampling procedures and provided us with the necessary equipment for sampling, preserving and transporting the water sample to its premises in Yaoundé.

• Documentary research through document consultation , scientific articles and journals have enabled the creation of a digital database on drinking water supply in sub-Saharan Africa, in Cameroon and in Bertoua, as well as the waterborne diseases found there.

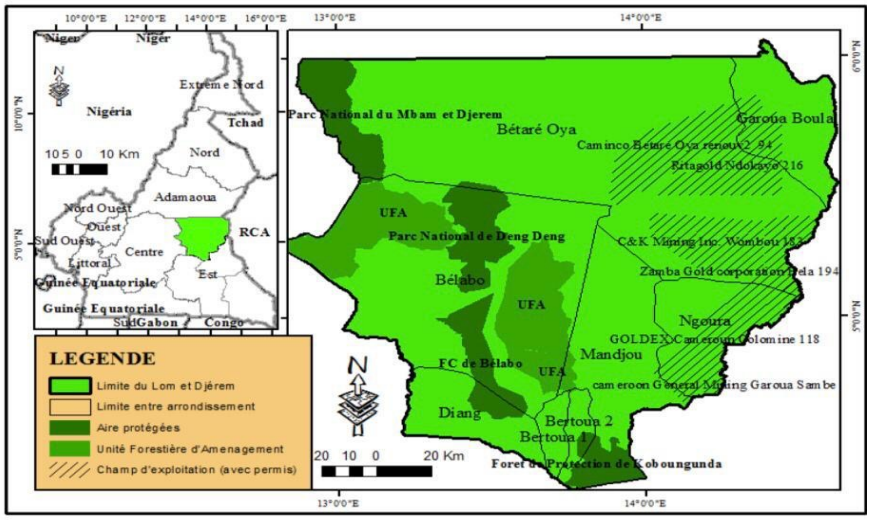
• Field surveys, participative investigations and interviews with authorities involved

in drinking water governance have enabled us to complete our observations and better question governance. Discussions with Camwater regional delegates for the East provided an opportunity to trace back efforts made to connect vulnerable populations to the public network, treat the water and ensure customer satisfaction. Interviews at the Bertoua 1er and 2e Councils enabled us to identify drinking water-related challenges in their constituencies, given the powers transferred to them by the State. Deputy Divisioner Officer of Bertoua 1er and Bertoua 2e provided an insight into the scope of action of the administrative authorities in dealing with water-related complaints. Our visit to the Regional Council for the East enabled us to clarify the role of this institution regarding legal provisions and means at their disposal. Doctors of the district hospital gave their opinion on the water problems in the locality and the waterborne diseases caused by the lack of drinking water. Traditional authorities of the Bertoua 1er and Bertoua 2e subdivision, especially the Ngaikada neighbourhoods, presented the plight of the local population and the endeavours undertaken by the latter to meet their water needs. The information gathered from the citizens via the questionnaires enabled us to assess their participation in water governance, their difficulties in accessing drinking water and their understanding of the role of local actors in water supply.

• The analysis of the data collected made possible the drafting of recommendations liable to improve water governance in Bertoua.

PRESENTATION OF THE STUDY GROUND

The target of the project is Bertoua, capital of the Eastern administrative region of Cameroon which recently became an Urban Community in 2008. Bertoua is the chief town of the Lom and Djerem division, one of the four divisions of the region. This division is made up of (8) subdivisions (Bertoua 1er, Bertoua 2e, Garoua Boulai, Bétaré Oya, Belabo, Diang, Mandjou, Ngoura). It hosts the Belabo communal forest and the Koboungunda protection forest.



Source : *ADE 2023*
Figure 1: *Localisation of the Lom and Djerem division*

Source : *Boume Njateng (2019)*
Figure 3 : *Bertoua, location*

Geographically, the Lom and Djerem is part of the south -Cameroon plateau, with a minimum altitude of 602 m, a maximum of 887 m and an average altitude of 719 m. It is built on geological formations rich in quartz, kaolinite, goethite and gibbsite. The entire landscape is grounded by Precambrian plateau belonging to the Mbalmayo-Bengbis series (Gartlan 1989). The soils are red ferralitic, clayey, soft and permeable, containing some humus. The drainage network is dendritic and dense, and the land is a plateau bristling with residual hills. The division is drained by a dense network of water systems. The two main rivers in the Congo basin flow into the Sanaga, while the rest are made up of many rivers, some of which feed the swamps.

Lom et Djerem has a subtropical climate with three seasons. A long dry season from December to mid-March; a short rainy season from mid-March to mid-May; and a long rainy season from mid-September to November. Temperatures are high throughout the year, with a maximum of 30°C and an average of 23 °C and 25°C. Rainfall is relatively abundant (between 1,500 mm and 2,000 mm per year).

The vegetation is broadly divided between rainforest (most of which are protected areas) and a forest-savannah mosaic (in the north). Within these two major groups, there are different vegetation types, including semi-deciduous forests of

Caesalpinioideae, secondary forests, gallery forests, swamp forests, grassy savannahs and wooded shrublands (Letouzey, 1985). The diversity of these habitats and the landscapes they form are a potential attraction for tourists. These ecosystems are even more spectacular as they are crossed by large rivers (including the Lom-Pangar, Djerem and Sanaga rivers) with deep valleys offering wide panoramic views.

The fauna of the northern part of this division (forest-savannah mosaic) seems to be characterised by low densities and is not very appealing. On the other hand, the forest is not only better preserved, but also teems with «heritage» species such as the great apes (chimpanzees and gorillas). Avifauna, herpetofauna and entomofauna appear to be particularly interesting , although exhaustive inventories are required.

The East region, like the Lom and Djerem division , is very sparsely populated. This has led to an influx of migrants whose only interest is mining, and 70% of the population is non-native. The western part of Lom and Djerem is empty and underpopulated, while the eastern part is developed and has a major trade flow with the Central African Republic.

Bertoua, which hosts most of the population of the East, is the chief town in the region due to its status as regional capital. Its geographical location between latitude 4° 34′ 30′′ North and longitude 13° 41′ 04′′ East makes it the main development centre of the Eastern region and a real crossroads linking the «Far North"

and the «South" region of Cameroon. Drained from north to south by the Djadombe River, Bertoua was founded around 1927 by Gbaya hunters from the Central African Republic. Agriculture, farming, handicraft, forest industry and trade are the main economic activities in Bertoua.

During the 2005 population census Bertoua had a population of 94,889 (RGPH3). Over the years, its population has grown. In 2021, Bertoua counted 218 111 inhabitants *(https://cm.2markers.com/210518)*.

SAMPLING AND THE ROLE OF ACTORS

Camwater's regional delegation for the East, administrative authorities (Subdivisional Officers), district hospitals, traditional chieftaincies and citizens.

◌ The Regional Council for the East

The management of natural resources and the environment is one of the competences transferred by the State to the regions. According to articles 19, 20 and 21 of Law No. 2004/019 of 22 July 2004 laying down the rules applicable to the regions, the Regional Council is responsible , among other things for:

- Water management in the region's interest.
- Coordination of development actions
- Support urbanism and housing-related actions of councils
- Equip, manage and maintain health facilities.
- Implement hygiene and prevention measures.

These competences entitle the regions to monitoring the arrangements put in place by those in charge of supplying the region with drinking water to ensure the well-being of the population and the smooth functioning of health facilities.

◌ Bertoua 1er and Bertoua 2e Communities

La commune représente la collectivité territoriale décentralisée de base. La Loi The community is the basic decentralised territorial community. Law No. 2004/018 of 22 July 2004 laying down the rules applicable to Councils assigns the Bertoua 1er and Bertoua 2e councils with the general mission of local development and improving the living environment and conditions of their population. This law is supplemented by decree No. 2010/0239/PM of 26 February 2010, which lays down condition for the exercices of power transferred by the state to councils relating to safe drinking water supply in areas not covered by the public distribution network. According to this decree, the State concedes to councils the project ownership and management of wells and boreholes via:

- The carry out of studies, the construction and layout of wells and boreholes.
- The conservation, protection and sustainable use of water.
- The servicing and maintenance of all the wells and boreholes under the council.
- Ensure that necessary measures for public health and hygiene around the said

wells and boreholes are taken.
- The servicing and maintenance of drinking water supply projects.
- The creation of a drinking water supply file for the council.

Articles 09 and 10 of the aforementioned decree stipulate that the transfer of the State's power for the management and ownership of wells and boreholes projects is accompanied by the concomitant transfer of the necessary resources. This provision is taken into account by the Finance Act, which each year provides for the resources needed to exercise these powers. According to article 15 of this decree, the councils and the decentralised State services are therefore required to draft a half-yearly report on the state of implementation of these powers and to channel it to the Minister for Decentralisation and the Minister of Water Resources and Energy.

Discussions with the Bertoua 1er and Bertoua 2e council staff enabled us to collect data on the management of power transferred by the State to them and the challenges encountered.

◌ Camwater's Regional Delegation for the East

CAMWATER is a state-owned company created by decree No. 2005/494 of 31 December 2005 under the name: Cameroon Water Utilities Corporation (CAMWATER) A 30-year concession and infrastructure management contract was signed between the State and the state-owned company , renewable by 10 years, for the production and distribution of drinking water in Cameroon.

CAMWATER was created in response to a new public-private partnership vision in the.distribution of water in Cameroon. Under a 10-year leasing contract, which can be extended for another 05 years, the management of drinking water involves 03 actors ,which are the State, CAMWATER and the private operator Camerounaise des Eaux (CDE). In this trio, CAMWATER acts as project manager for main investments and supervises the leasing contract jointly with the State, the leasing authority. The operator (CDE) is involved in CAMWATER's investment planning, has its own investment obligations (connections, equipment renewal) and collects all revenue from water sales.

Decree no. 2018/144 of 20 February 2018 reorganising the Cameroon Water Utilities Corporation will greatly increase this institution's control over water management in Cameroon. Placed under the technical supervision of the Ministry of water resources and the financial supervision of the Ministry of Finance, this decree will entrust it with the management of assets allocated to the public drinking water service, as well as the operation of the public drinking water production, transport and distribution service in urban and periurban areas.

Located in the Douala, CAMWATER has a regional delegation in Bertoua covering the

East region.

◌ Administrative authorities (subdivisional officers) of Bertoua 1er and Bertoua 2e

The subdivisional officer, for public interest has a leadership and counselling role in the key aspects of community life: social and cultural life. As a senior civil servant and direct representative of the divisional officer in the subdivision, he carries out the tasks assigned to him according to the law. Stakeholders of local development, he is closest to the population's daily concern. Article 61 of decree no. 2008/377 of 12 November 2008 defining the powers and duties of Heads of Administrative Units and the Organisation and functioning of their services, states that the subdivisional office has a local development support office in charge of:

- Participative planning and the fight against poverty.
- Issues relative to the production and sales of products.
- Civil protection.
- Public health and hygiene.
- Economic, social and cultural problem.

Access to drinking water, considered as government's priority because it is essential for health, hygiene and the achievement of the Sustainable Development Goals (SDGs), is a core concern of the Bertoua 1er and Bertoua 2e Subdivisional Officers, whom we met during this project.

◌ Bertoua 2e District Hospital

The modification of the organisation chart of the Ministry of Health (MINSANTE) following decree n°95/040 of 7 March 1995 reorganising the health system at three levels. The central level represented by MINSANTE and its departments, the intermediate level represented by the regional health delegations and the peripheral level represented by the health district. In charge of drawing up health action plans, monitoring and supervising health areas, the health district is served by a primary referral hospital (district hospital), which in theory is should provide citizens with quality health care. The consumption of contaminated or untreated water can cause many waterborne diseases, so the citizens of Bertoua 2e subdivision turn to the district hospital (referral hospital) and subdivision medical centres for quality health care given its proximity.

◌ Traditional Chieftaincies

Article 19 of decree no. 77/245 of 15 July 1977 on the organisation of traditional chieftaincies in Cameroon states that, under the authority of the Minister of Territorial Administration (MINAT), the role of traditional authorities is to assist administrative

authorities in their task of supervising the population. Defined by article 24 of Law no. 98/005 of 14 April 1998 on the Cameroon water regime as potential actors in conflict resolutions relating to the use of water resources based on local customs

Levels	Structures administrative	Power	Care centres
Central	Central services	Political leadership, policy and strategy drafting .	General referral hospitals, hospitals and Teaching hospitals
Intermediate	Provincial delegations	Technical support to districts and programmes	Provincial hospitals
Peripheral	Health district	Programme implementation	District hospitals,subdivision medical centres, Health centres

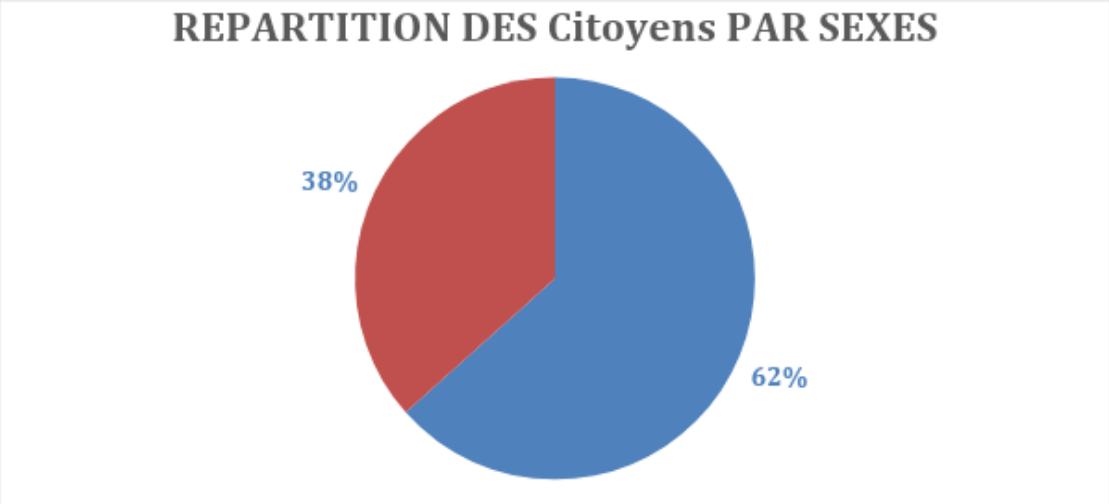
Tableau 1 **:** *Health pyramid in Cameroon*

and practices, traditional chiefs are charged with watching over the population and to Act as a transmission belt between them and the authorities.. Mindful of ground realities observed and the high number of complaints relative to drinking water access, chieftaincies targeted in this project were selected in the Bertoua 2e subdivision. These chieftaincies are:

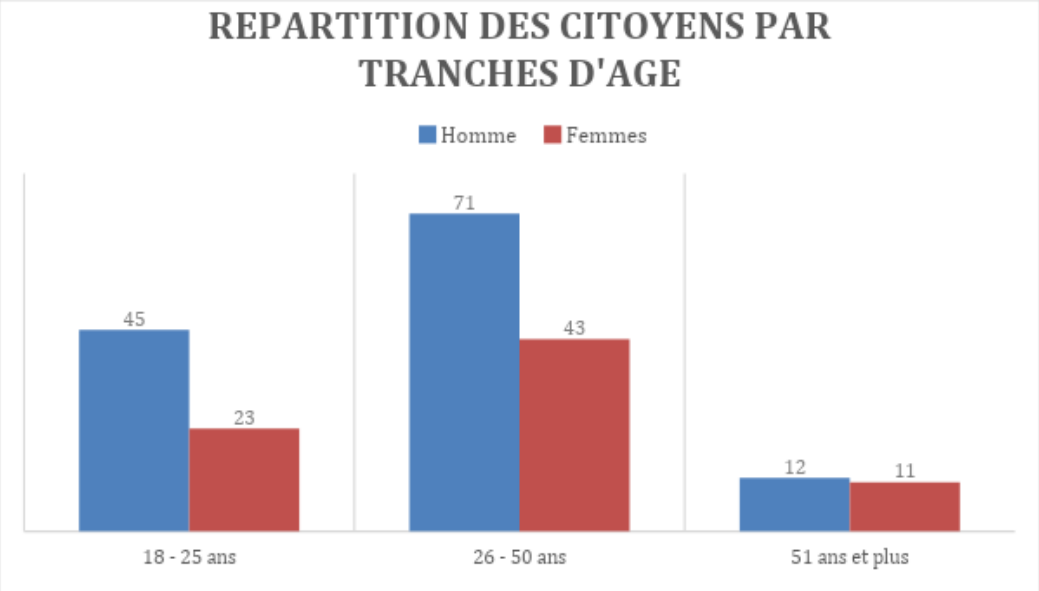
- The Ngaikada 1st class chieftaincy or Royal Palace.
- The western traditional Chieftaincy(paramount chief of the western colony of the West in the region)

◌ Citizens

It is increasingly accepted in government policies that citizens' access to safe, drinking water is one of the fundamental elements in building resilience to climate change. The recent cholera outbreak in Cameroon once more drew the attention to the need for clean drinking water for their needs. Although the main beneficiaries of drinking water supply policies, the Bertoua population complains of inequality in their enjoyment of the right of access to clean, safe drinking water. While status quo in the Bertoua 1er subdivision seems less serious, in the Bertoua 2e subdivision people live hazardous situations and find it hard to get water fit for drinking, cooking and personal and household hygiene. In an attempt to understand the challenges in this council, 205 inhabitants of the Bertoua 2e Council were gathered within the chieftaincies of Ngaikada and Bertoua 2 neighbourhood to complete a data collection questionnaire.



Source: *Field survey in Bertoua, 2023*
Figure 4: *Gender-based division of surveyed citizens*



Source: *Field survey in Bertoua, 2023*
Figure 4: *Age group-based division of surveyed citizens*

RESULTS

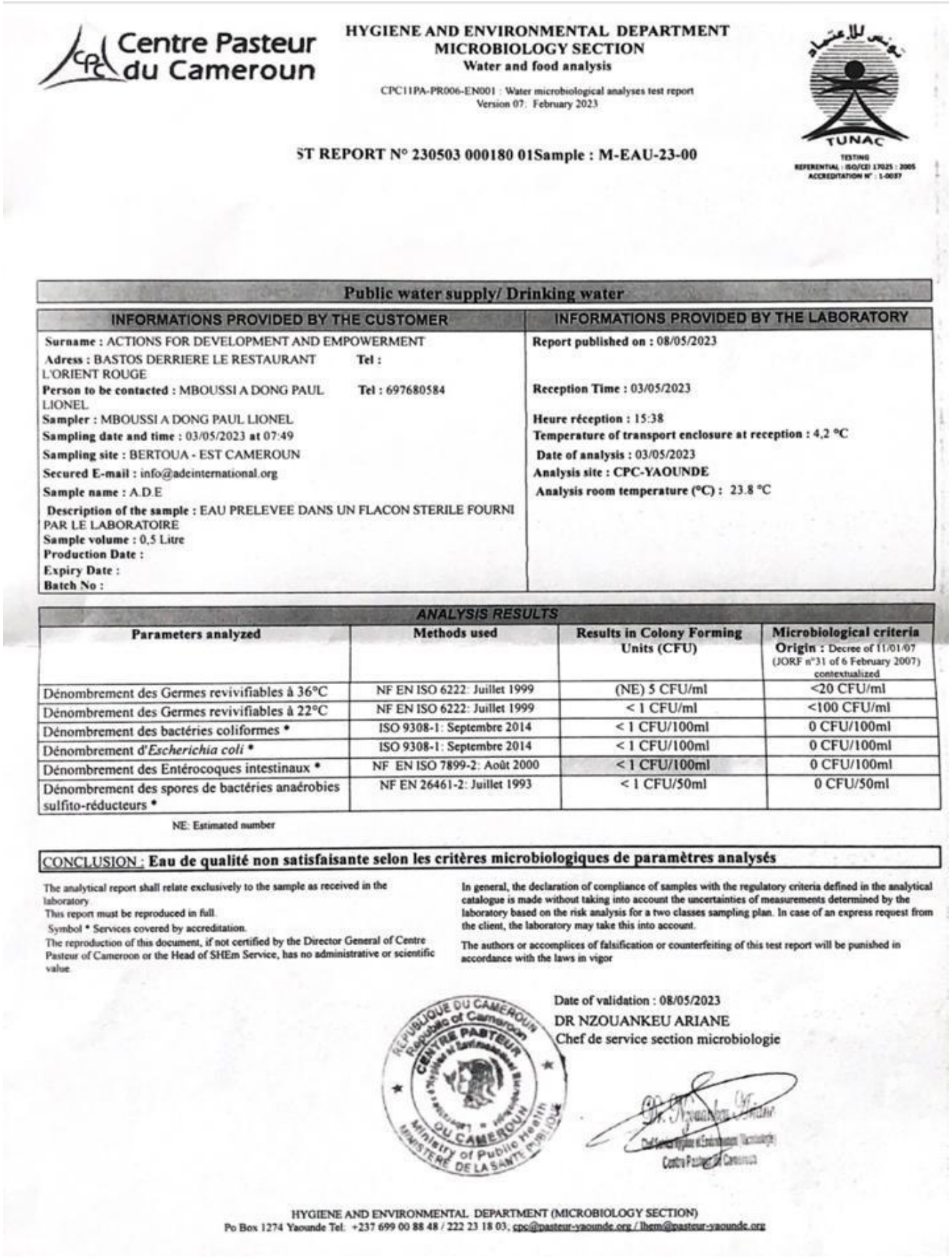
Researchs carried out have identified factors hindering universal access to drinking water in Bertoua, and the full enjoyment of the right of access to drinking water. International human rights law calls on states to work towards universal access to drinking water without discrimination, while prioritising those who need it most. The following report presents facts observed during investigations carried out in Bertoua.

1- Satisfactory quality of water collection, treatment and distribution facilities.

Outdated installations and equipment have very often been highlighted as the main cause of the low yield of water production and the lack of real access to drinking water for Bertoua citizens. Visiting the CAMWATER's Regional Delegation for the East. made us grasp the efforts made by those involved in water governance at the national and local level to improve water production and distribution. The Bertoua rehabilitation, reinforcement and extension project of drinking water supply system has improved the city's drinking water supply through the installation of collecting equipment on a surface water reservoir, a technical room equipped with a pumping system, a treatment plant made of a flocculation-settling-self-cleaning filter system, water tanks, a technical building for dosing reagents, a machine room, etc.
The visit provided an insight into the quality of the equipment and mechanisms used to treat water, the products used and the procedures in place to handle complaints about the service provided by CAMWATER in the region.

2- The unsatisfactory quality of public supply water according to the microbiological criteria of the water sampled.

Water treatment after it is collected is to purify it and make it safe for consumption. Controlling dosages is essential for eliminating microbiological waste that could adversely affect the quality of this water passed on to households and customers. Also, the pipes, taps and water conduits also play a major role in preserving water's properties. As announced by the Minister of Water Resources and Energy (MINEE) the day after the project to reinforce and extend the drinking water supply system in Bertoua was financed, a water sample was taken from the tap outside the Bertoua central police station in the Bertoua 1er subdivision, in order to ensure that the water consumed by citizens complies with current standards. Thanks to sampling instructions and equipment made available to us by the Centre Pasteur lab in Yaoundé, the sample was sent to this laboratory, accredited for quality control of drinking water.
Analysis of the water sample for public consumption carried out in the laboratory by the Centre Pasteur in Yaoundé reveal: **An unsatisfactory water quality based on the microbiological criteria of analysed parameters.**
Discussions with CAMWATER's Regional Delegate for the East helped to identify possible reasons for this result. Water quality received by some citizens depends on the quality of the facilities and the network's layout.



Centre Pasteur du Cameroun

HYGIENE AND ENVIRONMENTAL DEPARTMENT
MICROBIOLOGY SECTION
Water and food analysis

CPC11PA-PR006-EN001 : Water microbiological analyses test report
Version 07: February 2023

TUNAC
TESTING
REFERENTIAL : ISO/CEI 17025 : 2005
ACCREDITATION N° : 1-0057

ST REPORT N° 230503 000180 01Sample : M-EAU-23-00

Public water supply/ Drinking water

INFORMATIONS PROVIDED BY THE CUSTOMER	INFORMATIONS PROVIDED BY THE LABORATORY
Surname : ACTIONS FOR DEVELOPMENT AND EMPOWERMENT **Adress :** BASTOS DERRIERE LE RESTAURANT L'ORIENT ROUGE **Tel :** **Person to be contacted :** MBOUSSI A DONG PAUL LIONEL **Tel :** 697680584 **Sampler :** MBOUSSI A DONG PAUL LIONEL **Sampling date and time :** 03/05/2023 at 07:49 **Sampling site :** BERTOUA - EST CAMEROUN **Secured E-mail :** info@adeinternational.org **Sample name :** A.D.E **Description of the sample :** EAU PRELEVEE DANS UN FLACON STERILE FOURNI PAR LE LABORATOIRE **Sample volume :** 0,5 Litre **Production Date :** **Expiry Date :** **Batch No :**	**Report published on :** 08/05/2023 **Reception Time :** 03/05/2023 **Heure réception :** 15:38 **Temperature of transport enclosure at reception :** 4,2 °C **Date of analysis :** 03/05/2023 **Analysis site : CPC-YAOUNDE** **Analysis room temperature (°C) :** 23.8 °C

ANALYSIS RESULTS

Parameters analyzed	Methods used	Results in Colony Forming Units (CFU)	Microbiological criteria **Origin :** Decree of 11/01/07 (JORF n°31 of 6 February 2007) contextualized
Dénombrement des Germes revivifiables à 36°C	NF EN ISO 6222: Juillet 1999	(NE) 5 CFU/ml	<20 CFU/ml
Dénombrement des Germes revivifiables à 22°C	NF EN ISO 6222: Juillet 1999	< 1 CFU/ml	<100 CFU/ml
Dénombrement des bactéries coliformes *	ISO 9308-1: Septembre 2014	< 1 CFU/100ml	0 CFU/100ml
Dénombrement d'*Escherichia coli* *	ISO 9308-1: Septembre 2014	< 1 CFU/100ml	0 CFU/100ml
Dénombrement des Entérocoques intestinaux *	NF EN ISO 7899-2: Août 2000	< 1 CFU/100ml	0 CFU/100ml
Dénombrement des spores de bactéries anaérobies sulfito-réducteurs *	NF EN 26461-2: Juillet 1993	< 1 CFU/50ml	0 CFU/50ml

NE: Estimated number

CONCLUSION : **Eau de qualité non satisfaisante selon les critères microbiologiques de paramètres analysés**

The analytical report shall relate exclusively to the sample as received in the laboratory.
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The authors or accomplices of falsification or counterfeiting of this test report will be punished in accordance with the laws in vigor

Date of validation : 08/05/2023
DR NZOUANKEU ARIANE
Chef de service section microbiologie

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Source : *Centre Pasteur de Yaoundé*

Figure 6 : *Résultat de l'analyse de l'échantillon d'eau prélevé*

◌ Galvanised pipes and deterioration in drinking water quality.

Those connected to the water supply network by facilities made with galvanised pipes embedded in the walls (iron pipes that have been coated with a layer of zinc) are likely to receive water with high levels of lead and rust, which after consumption causes a number of adverse health effects, especially in children. Unfortunately, the zinc barrier coating in the pipes, which is potentially an important source of lead, tends to react with the minerals in the water overtime, causing a build-up of plaque in pipes. As these galvanised pipes deteriorate, they rust completely from the inside out, thus polluting the water transported to households.

CAMWATER's new facilities are made from Polyvinyl Chloride (PVC), which is a non-conductive, environmentally friendly material easy to maintain and which offers excellent thermal and acoustic performance.

◌ Sloping network.

The layout of the network influences water pollution. A network is said to be on a slope or to have gravity flow when the water supply point is high enough above houses such that the slope is used to serve the population without necessarily having to install pressure pumps. With this layout, the rust in the outdated facilities pollute the water and easily carry it to tapes.

3- Combination the reference laboratory for microbiological analysis of water properties.

According to article 11 of law No. 98/005 of 14 April 1998 on the water regime, any person offering water for human or moral consumption, whether charged or for free, in any form whatsoever,should ensure that the quality of this water complies with the standards in force, whether from private wells, tanks or tapped springs. To ensure that the drinking water quality complies with regulations, citizens and those responsible for supplying the town with drinking water turn to the reference analysis laboratory, the Centre Pasteur of Cameroun. However, it should be noted that the distance to this reference analysis laboratory is a problem with regard to arrangements required for depositing samples in the laboratory for analysis. Located in Yaoundé, a citizen living in Bertoua who wishes to get to the Centre Pasteur of Cameroun is to make a 07-hour journey and that's when traffic is favourable.

The laboratory recommends that the water sample taken for analysis be delivered to the laboratory no more than 8 hours after it has been sampled, not to mention the fact that the laboratory takes in samples from 7.30a.m. to 3p.m., except on public holidays. This leaves very little room for manoeuvre when you consider dealings likely to be encountered at travel agencies and the traffic jams on the road. The distance to the reference analysis laboratory, which demands costly, transportation, storage and transport of equipment and long trip, maybe determining factors in analysing the compliance of microbiological properties of the water with the standards in force. A citizen in Bertoua would have to make 03 trips (to and fro) to have the microbiological analysis results of the water in his well, borehole or developed spring.

- The first trip to pay for the analysis and receive sampling equipment.

- The second trip is to drop off the samples. This stage requires good coordination of departure times of the transport vehicles and the working hours of the analysis laboratory offices.
- The third trip is to collect the results (though it is possible that they be emailed, the citizen would need facilitation arrangements necessary to obtain results via this channel).
This distance, combined with transport costs and ignorance on the part of some stakeholders, can act as an obstacle to compliance with current water standards.

4- Poor connection to the public drinking water supply network due to the lack of financial resources.

A meeting is then arranged between the customer and a CAMWATER agent, commonly known as the «quantity surveyor», who assesses the distance between the supply site (the customer's premises) and the main axis of CAMWATER's supply pipe installed in the area. It is at this stage that the agent assesses the cost of the facilities needed to connect the customer to the public drinking water supply network.
However, the investigations carried out show that 93% of citizens (205) in the Bertoua 2e subdivision targeted by this research do not engage in this practice because for lack of financial resources.

Source : *Field survey in Bertoua, 2023*

Figure 7 : *Connection of the population surveyed to the CAMWATER network*

To the question, "Why are you not connected to the CAMWATER network? " two answers came up repeatedly: "I don't have enough money to do that," "CAMWATER pipes don't reach my area."

Those connected to the network in this subdivision received funds in 2016 from the African Development Bank (AfDB) for social connections in the city. This aid was exclusively to cover social connections-related costs to the public drinking water supply network, to the detriment of subscription costs. The support equally enabled many citizens connect to the public drinking water supply network.

Connection type	Distance (metres)	Connection and subscription total cost In CFAF	Reference
Social connections Under the (AfDB) project	**28 m**	**36,284**	CDE quote no. 3120 dated 05 September 2016
Social connections outside the (AfDB) project	**7 m**	**147,554**	Quote CAMWATER no.4953 dated 15 February 2023

Source : *Field survey in Bertoua, 2023*

Tableau 2 : *Presentation of connection costs*

Connection type	Distance (metres)	Subscription cost	Connection cost	Total cost in FCFA
Connection under (AfDB) project	**28 m**	25,659	**10,625**	**36,284**
Connection outside the (AfDB) project	**7 m**	25,659	**121,895**	**147,554**

Source : *Field survey in Bertoua, 2023*

Tableau 3 : *Presentation of the difference in connection costs*

This difference in connection costs highlights the impact of the cost of equipment needed to connect residents to the public supply network. With the Bank's support, citizens living 28 m from the network were able to pay a connection fee of CFAF 10,625, that is CFAF 2,656.25 for 7 m. Without this support, citizens living 7 m away would pay an estimated connection cost of CFAF 121,895, 46 times the amount paid with AfDB's support. This situation is even worse for people located 50 or even 100 m from the main axis of supply pipes.

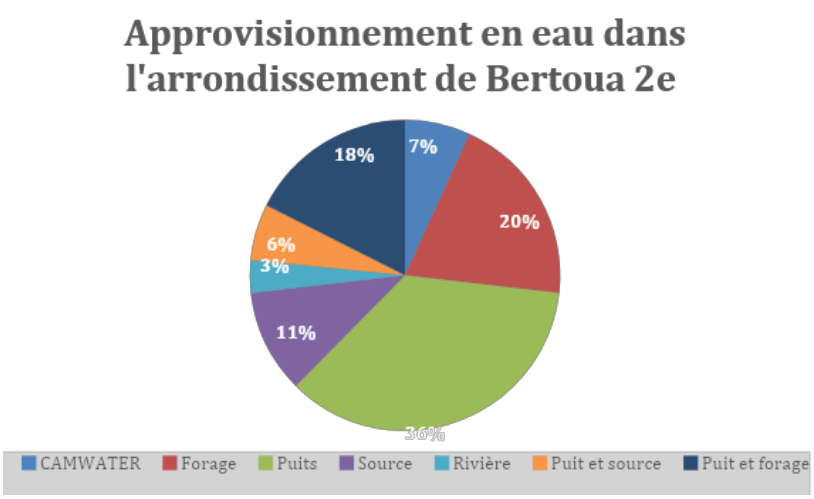
This naturally excludes people with low incomes. Moreover, CAMWATER also has a payment policy for people on low incomes, which stipulates that they can pay for the connection to the network in 12 monthly instalments. However, this policy is not well

known to the population due to low awareness and information campaigns limited to consumers (network subscribers).

5- Acute shortage of clean water in Bertoua 2nd subdivision.

In the absence of financial resources to connect to the public drinking water supply network, Bertoua 2e residents have resorted to cheap practices to get water
- Only (7%) of the population is connected to CAMWATER's network.
- (36%) of the population rely solely on well water.
- (20%) of the population rely solely on bore-holes.
- (17%) of the population use both wells and boreholes, boreholes for drinking water and wells for cooking and hygiene.
- (6%) of the population use wells and springs, spring water for drinking and well water for cooking and hygiene.
- (11%) of the population solely use spring water.
- (3%) of the population rely solely on river water.

Though there is diversity in the subdivision's water supply, attention must be paid to the water quality made available to the population in these alternative sources. Article 11, paragraph 1 of Law No. 98/005 of 14 April 1998 on the water regime stipulates that : "any person offering water for human or moral consumption, whether charged or for free, in any form whatsoever,should ensure that the quality of this water complies with the standards in force", paragraph 2 further says: "The above-mentioned provisions also apply to any one who, in the absence of a public supply of drinking water, makes use of private wells, tanks designed to store water or tapped springs."



Source : *Field survey in Bertoua, 2023*
Figure 8 : *Water supply in the Bertoua 2e subdivision*

The water supply situation in Bertoua 2e subdivision is rather unusual:

- The existence of 02 main supply points for the whole neighbourhood.
These points are a well (Unicef donation) and a developed spring. However, accessing water at the borehole remains difficult because of the long queues (many people want water with many containers) and the spring is polluted in the rainy season with the rise of dirty water and mud through the pipes. Faced with this reality, people are building wells in an uncontrolled way in order to meet their needs.

"Authorities promised to give us drinking water, but since then we've been waiting for them to come", "I myself have already dug more than 20 wells in the neighbourhood because we manage to get water ourselves." These are some testimonials gotten from the population. The water source above (first picture on the left) is one of the

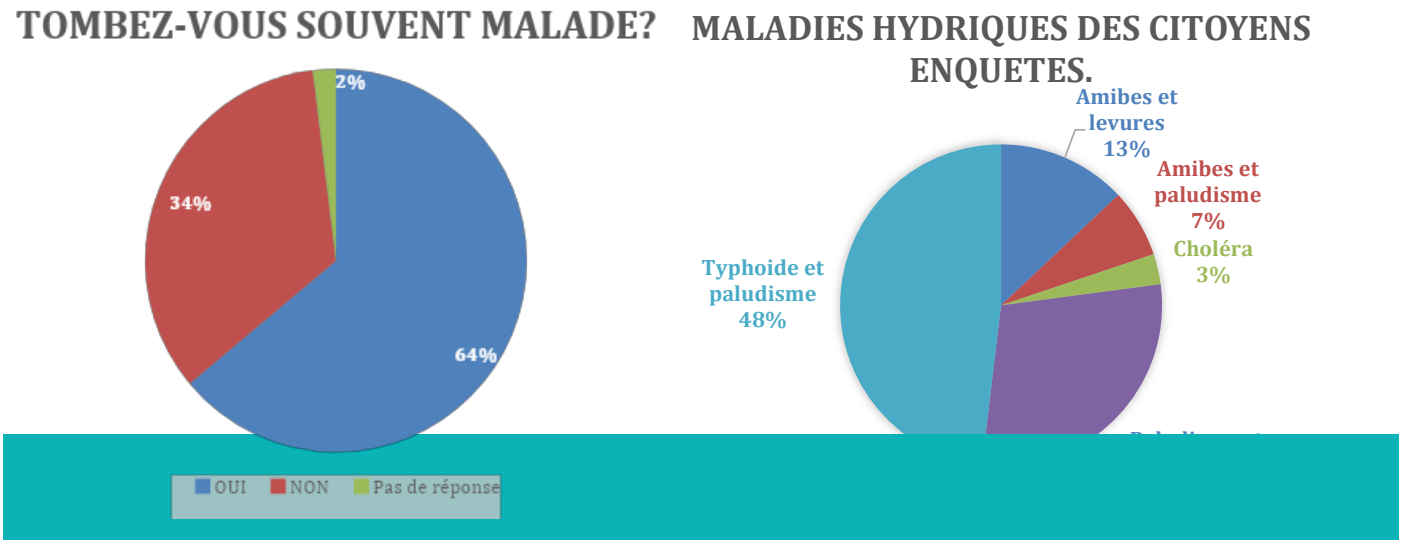
Source : *Field survey in Bertoua, 2023*

Figure 9 : *Water points in the Bertoua 2 neighbourhood with health risks*

two main supply points in Bertoua 2. During the rainy season, the dirty water rises to the pipes through which the clean underground water ought to flow. This dirty water rise causes sludge to build up all along the pipes, polluting the water. People use these so-called «drinking» water points mainly to cook, drink and for personal and household hygiene, despite the high risk of contracting waterborne diseases.
The well pictured above (right) is one of the many wells used by the local population to obtain water.

6- The existence of numerous water-borne diseases in the subdivision.

Reliable drinking water supplies are limited in the Bertoua 2e subdivision. The population resort to water supply methods that impact their health considerably. The citizens surveyed for this research admit having had frequent health issues.
Although 64% of the population admit that water they drink regularly causes make them ill, let's equally note that 34% declared that the water does not cause them health issues because, in their opinion, their bodies have gotten used to drinking this water. "The water doesn't make me sick any more, my body is already used to it, my children are those bothered by it," said a Bertoua 2 residents.



Source : *Field survey in Bertoua, 2023*

Figure 10 : *Population with waterborne diseases*

Source :*Field survey in Bertoua, 2023*

Figure 11 : *Water-borne diseases of surveyed population.*

The doctor we spoke to at the district hospital in Bertoua 2e said waterborne diseases were
hydro-sanitary and vector-borne diseases encountered by surveyed population. They are:

- Cholera: also known as "dirty hands" disease, cholera is caused by vibrio cholerae. 3% of the population exposed to water-borne diseases in this survey contracted the disease. It is transmitted through the consumption of water or food contaminated by the faeces of infected people. This is an acute bacterial infection of the intestines. If not treated, it can lead to severe dehydration and even death. It is prevented by drinking clean, safe water, applying good hygiene practices and meticulous sanitation.

- Diarrhoea: It is the symptom of an infection caused by a large number of viral, bacterial and parasitic organisms, most of which are spread through contaminated water. This disease frequently appears after the use of non-potable water used for drinking, cooking and when main hygiene rules are not respected. It kills 1.8 million children every year, over 90% of whom are under the age of 5. 29% of the population exposed to water-borne diseases in this survey contracted the disease.

- Malaria: While malaria is one of the world's most important parasitic infectious disease, it should be noted that when it comes to vector-borne diseases, it is one of the greatest killers in sub-Saharan Africa. Malaria is one of the tropical diseases whose epidemiology has been significantly affected in recent years by ongoing climate change. This disease is caused by a parasite of the genus Plasmodium falciparum and is transmitted to man through the bite of a female mosquito of the Anopheles gambiae genus (DEMTEZEMB and al., 2021). This endemic disease is widespread in Cameroon. Through the adoption of a National Malaria Control Programme (NMCP) and the adoption of a "High Burden to High Impact" stratification exercise,

the government has made the fight against malaria one of its main priorities in its national health sector strategy. A total of 36% of the population exposed to water-borne diseases in this survey contracted the disease.

- Typhoid: It is above all a disease caused by dirt. It is caused by salmonella typhi and salmonella paratyphi bacteria. Asymptomatic and pre-symptomatic carriers spread germs around easily via vomit, urine and faeces. A simple hand shake is enough to transmit the resistant germs. It can occur after drinking water contaminated with faeces or sewage with bacteria deposited by flies, or after the take in of food or drink handled by an infected person. The disease is treated with antibiotics or by vaccination with inactivated antigens administered as drinkable drops or injectable vaccines (the cost of which is high for the average Cameroonian). Another way to fight the disease is through prevention, which implies living in a healthy environment, washing fruit and vegetables properly before eating, and drinking clean, and safe water. In the Bertoua subdivision, 48% of the population exposed to water-borne diseases in this survey contracted the disease.

- Amoebae or amoebic dysentery: This is an inflammation of the colon or small intestine that often has a sudden onset and is reversible within a few days. Also known as amoebiasis, it is caused by the amoeba Entamoeba Histolytica, a microscopic protozoan parasite. It is highly prevalent in tropical areas. This disease is transmitted via the faecal-oral route or by consuming contaminated water or badly washed vegetables with faecal particles. Its symptoms are frequent diarrhoea, bloody stools, abdominal pain, mucus in the stools, tenesmus, fever and vomiting. The first-line treatment for amoebic dysentery is antibiotic therapy, rehydration (rice, cooked carrots and water consumption) and coproculture to identify the germ responsible for the disease. The disease can be prevented by complying with sanitary measures, good hygiene practices, using fly repellents, ensuring that raw fruit and vegetables are properly cleaned, building hygienic latrines and ensuring a supply of drinking water. In the Bertoua 2e subdivision, 7% of the population exposed to water-borne diseases in this survey contracted the disease.

7-The exercise of competences of the DTCs mitigated by the lack of resources.

Decentralisation in Cameroon makes Decentralised Territorial Collectivities (DTCs) main actors in local drinking water supplies. Though the law recognises that the President of the Regional Council as in charge of managing water for regional interest, this makes him somehow responsible for supplying water to the population concerned. It should also be noted that the town council has a much more major role, that of building water points in areas not covered by the public supply network. The actors involved need both human and material resources to deliver. The effectiveness of this transfer of resources to the East region has a major impact on water management.

- The non-operationality of the Regional Council for the East in water governance.

The rules applicable to the regions are set out in Law no. 2004/019 of 22 July 2004.

Articles 12 & 13 of this law states that *"Projects or operations of local interest initiated on public coast lands and waterways by natural persons, DTCs or any other corporate bodies, shall require the authorisation of the regional council by decision of the local council and State representative",* a provision that involves the regional council in local water governance.
Discussions with authorities of this institution reveal that, despite the provisions of the law, their administration is not operational in this area and is understaffed (the institution operates with 07 elected members and a few temporary staff). The lack of human, material and financial resources hinders full deployment of their skills. The institution's current activities focus on setting up development promotion infrastructures such as tourism agencies, banks, environmental agencies and others. These actions aim to create institutions under the control of the Regional Council.

- Lack of financial resources at Bertoua 1er and Bertoua 2er city council

Unlike the Regional Council, city councils have a much more practical role to play, with instant results. According to the powers transferred to them by the State, local councils are charged with the construction and maintenance of water points (wells, boreholes and developed springs). The city council in compliance with its Local Development Plan (LDP): decides where the project will be implemented, awards the construction contract to a service provider and follows up the implementation of the project and the maintenance of the works by the technical department (of the city council).
According to local authorities, the be implementation of this competence suffers a lack of resources. More than half of the water points in the Bertoua 1er subdivision suffer recurrent breakdowns, especially boreholes (human-powered pumps), which require funding for maintenance or a change of policy. These needs are the order of the day within the Federation of Management Committees set up by the Bertoua 1er municipal executive to manage and follow-up with water points. This federation, which meets once every 6 months, gathers the general public and health officials.
In Bertoua 2e, where the situation seems chaotic, the absence of financial resources in the deployment of the power transferred is the order of the day. As a matter of fact, since decentralisation, only about fifteen projects have been implemented by the city council to supply drinking water to the Bertoua 2e population. However, several neighbourhoods in the subdivision are not covered by CAMWATER's central supply network. In Bertoua 2e, for instance,a pipe was installed in 2023 to serve as CAMWATER's central axis but does not cover the entire neighbourhood.

8- The ongoing conflicts hindering the population from meeting their drinking water needs

Collaboration between actors on the ground involved in water governance is one of the fundamental factors in the effectiveness and efficiency of water policies. Conflicts between CAMWATER and mayors of the Bertoua 1e and Bertoua 2e councils caused by misunderstandings are seriously hindering the population from enjoying their right to access drinking water. These conflicts are caused by standpipe management at

the Bertoua 1e city council and damages to the CAMWATER network in the Bertoua 2e subdivision.

- Standpipe management conflict in the Bertoua 1er subdivision.

The rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system foresee the construction of 60 standpipes to improve the population's access to drinking water. The city council has therefore provided for their construction sites. Once the facilities were built, questions as to how they should be managed, arose. According to the mayor, the management of these facilities should be done by the city council, so that water could be free of charge for the population. Meanwhile CAMWATER believes that access to water by the public should be charged for site maintenance and payment of water bills. This misunderstanding is the reason the standpipes are not operational since the CAMWATER Regional Delegation relies on private service providers to operate these standpipes. Individuals wishing to use these sites to sell water must meet a number of requirements and complete a number of administrative formalities.

Thirty-five out of the 60 standpipes built as part of the project are operational and 25 are not due to the absence of service providers.

Source : *Enquête de terrain dans la ville de Bertoua 2023*

Figure 12 : *Borne fontaines de la CAMWATER en non activité*

- The conflict over damaged CAMWATER installations.

During its public planning works (reprofiling roads) in 2022, the CAMWATER drinking water supply network precisely in the NGAIKADA neighbourhood was damaged by

the Bertoua 2e city council. This damage interrupted CAMWATER's drinking water supply service to many consumers. According to CAMWATER's Regional Delegate, the city council ought to repair the damaged caused. This repair is a prerequisite in keeping with its water supply service. A request was therefore addressed to the city council. Since the city council did not comply with CAMWATER's request, citizens who subscribe to the public drinking water supply service have no water.

9- The lack of a drinking water supply at Bertoua 2 district hospital

The Bertoua 2e district hospital is the Bertoua 2 referral hospital and it is not connected to the central drinking water supply network. According to hospital officials, the lack of drinking water and low frequency of awareness campaigns in the town are the main cause of waterborne diseases in their region. This lack of water has a major impact on their daily activities.

Whether in a public or private hospital, water needs are significant and varied. The report estimates the hospital's daily need to 750 litres of water. Depending on their uses, there are different types of water.Their physico-chemical and microbiological characteristics and the rules governing them.

We have:

- Water for consumption use either gotten from the public distribution network or from catchments specific to the healthcare centre.
- Water for medical use (purified water, water for injection, dilution water for concentrated haemodialysis solutions).
- Technical water (demineralised water, distilled water, osmosis water, softened water).
- Domestic hot water.

The Bertoua 2 district hospital, which is clearly not connected to the public supply network, does not even have water points. The health centre collects from water points near its site and stores in containers.

Observations made by the district hospital on the persistence of waterborne diseases in the region and the water needs of health centres have been channelled to the health district. However, letters advocating access to drinking water have been sent to the mayor and Subdivisional Officer.

THE MIXED RESULTS OF THE REINFORCEMENT AND EXTENSION PROJECT OF THE BERTOUA DRINKING WATER SUPPLY SYSTEM.

The rehabilitation, reinforcement and extension project of the drinking water supply system is a project financed in 2017 to the tune of 15,8 billion CFAF by Cameroonian government,the French Development Agency (AFD) and the European Bank for Reconstruction and Development (EBRD) Financed to the tune of 103 billion euros by the French Development Agency(AFD) and the European Investment Bank (EIB), this project is an integral part of the project aimed to improve drinking water supply in Yaoundé and three secondary towns (Bertoua, Edéa and NGaoundéré). Presented as a solution to BERTOUA's water problems, the work on the project to rehabilitate, reinforce and extend the drinking water supply system was completed by the BTD PROYECTOS ESPINA OBRAS consortium, a Spanish company operating in 22 countries in the water, health and vocational training sectors.

The works on this project aimed at:

- Improving water production.
- Rehabilitating and expanding the secondary and tertiary distribution networks to a total length of 128 km.
- Rehabilitation and extension of the treatment plant to increase the volume of water produced to 7,500m3.
- Construction of a new dewatering station.
- Installation of a new MV/LV transformer station.
- Making new connections.
- The creation of 60 standpipes.

The implementation of this project has considerably improved in the city's water production and storage capacity, making it easier for the population to access clean and safe drinking water. However, certain remarks seem to reduce the great impact of this project.

- Water Quality Degraded by Facilities

The aim of the project to improve Yaoundé's drinking water supply and three secondary towns (Bertoua, Edéa and N'Gaoundéré) and the project to rehabilitate, reinforce and extend the drinking water supply system Bertoua is mainly to improve the service and access to drinking water in Bertoua, Edéa and N'Gaoundéré. Although the water treatment at the catching and treatment facilities seems to be carried out with commendable professionalism, the unsatisfactory quality of the sampled water to be analysed at the Centre Pasteur in Yaoundé is sufficient proof that the facilities installed at some customers' premises affect the properties of water. This factor questions the merit of the above-mentioned projects, which equally aim to remedy the spread of

water-borne diseases in the city.

-The Persistence of Waterborne Diseases in Bertoua 2e Subdivision

The absence of a "social connections" phase to ease access to drinking water for the less well-off population by subsidising these connections seems to interfere with the expected results of the rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system. Despite the "moratorium connections"policy introduced by CAMWATER's Regional Delegate, which involves "giving customers the opportunity to pay the connection and subscription costs in at least 12 monthly instalments, depending on the customer's financial capacity", the low rate of connection to the public supply network of the Ngaikada and Bertoua 2 population cannot solve the persistent waterborne diseases. Only 7% of the population of these neighbourhoods is connected to the CAMWATER network, and 64% admit having contracted waterborne diseases.

"The lack of financial resources," is repeatedly given as the main reason for not connecting to CAMWATER's network, followed by ***«the lack of a connection network in the neighbourhood»,*** as CAMWATER's main network was only installed in BERTOUA 2 in 2023 and its coverage is partial, which equally penalises the district hospital found in the same area (it has no access to drinking water).

- Non-operational standpipes

Of the 60 standpipes announced by the Technical Director of BTD PROYECTOS ESPINA OBRAS, Luis Morales Pérez, 60 standpipes have been built, 35 are operational and 25 are not operational due to the absence of private service providers to manage them. These standpipes, which could profit the population are in disrepair. While the endeavour is praiseworthy, the implementation and management of these facilities seem to be experiencing difficulties that need to be resolved for the population enjoy these facilities and positively change their (water) consumption habits.

- Failure to meet project delivery deadline.

Launched in 2017, the initial deadline for the rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system was 18 months as mentioned in press release No. 074/CW/DG/DSCM/CTR 2017 of 14/02/2017 publishing the bid result following the restricted international call for tenders No. 16/AOIR/CAMWATER/DG/DSCM/CIPM/AFD-BEI/2016 of 11/10/2016 for the rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system. However, the project was delivered to CAMWATER on 13 December 2021, i.e. 04 years after the official launch of the project. The failure to meet the deadlines for this suffices to show that the project was extended which questions the project's readiness, impact and technical studies carried out.

DISCUSSION

Power transfer is the concrete manifestation of decentralisation in that it gives a real and objective dimension to the principle of subsidiarity (Pontier, 2003b). In Cameroon, the implementation of the powers conferred on decentralised territorial collectivities is not automatic; it is subject to additional texts that specify the procedures for implementing these powers. Although law no. 2004/017 of 22 July 2004 on the orientation of decentralisation lays down the general rules for territorial decentralisation in the drinking water sector, the actions of both collectivities, the regional council and the city council, are governed by well-defined texts. Law no. 2004/019 of 22 July 2004 laying down rules applicable to regions entrust them with the management of the region's water while the actions of councils are governed by law No. 2004/018 of 22 July 2004 laying down the rules applicable to collectivities. And decree no. 2010/0239/PM of 26 February 2010, which lays down condition for the exercices of power transferred by the state to councils relating to safe drinking water supply in areas not covered by the public distribution network. Through this decree, the State transfers project ownership and management of wells and boreholes to councils. The following are activities relative to this project management as listed in article 5 of this decree:

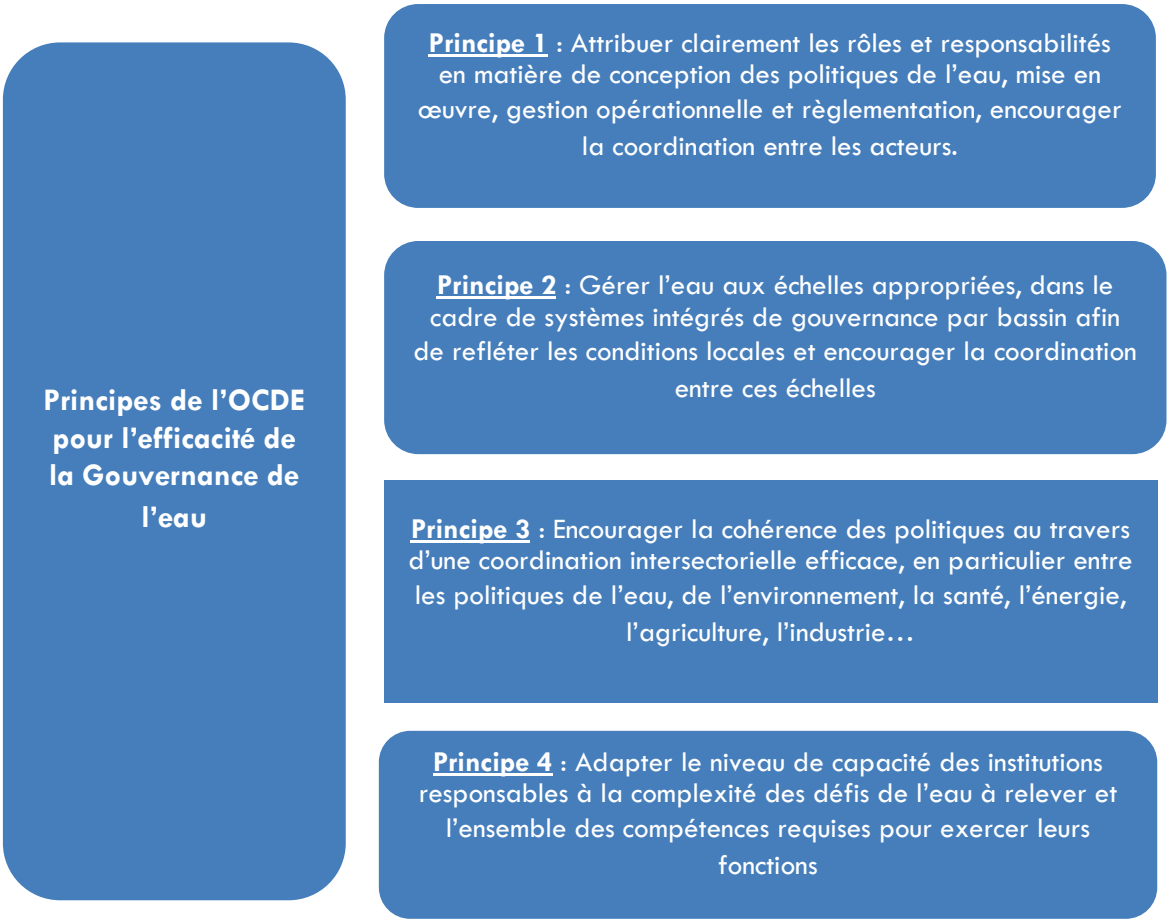
- The carry out of studies, the construction and layout of wells and boreholes.
- The conservation, protection and sustainable use of water.
- The servicing and maintenance of all the wells and boreholes under the council.
- Ensure that necessary measures for public health and hygiene around the said wells and boreholes are taken.
- The servicing and maintenance of drinking water supply projects.
- The creation of a drinking water supply file for the council.

Article 9 of the aforementioned decree stipulates that this transfer of State's power for the management and ownership of wells and boreholes projects is accompanied, in accordance with article 19 of law no. 2004/017 of 22 July 2004 on the orientation of decentralisation by the concomitant transfer of necessary resources. These include human, material and financial resources.

However, remarks made on the implementation of this power transfer in Bertoua

reveal a discrepancy between the statements in the texts and the reality.
Water management competence, for public benefit, of the East Regional Council and the mastery of works done by the Bertoua1er & Bertoua 2e councils are suffocating given the absence or insufficient financial, material and human resources. This lack is the root of the constant ordeal of vulnerable citizens in these areas in terms of accessing drinking water. The lack of developed water points and the defective state of the human-driven pumps cause the underprivileged to live in a state of constant water stress and to resort to alternative sources of dubious quality, such as rivers, wells and springs. The consumption of

these dubious waters and their use in households make for the outbreak of waterborne pathologies and the spread of water-borne diseases in these regions.
Despite efforts made by the head of the public drinking water supply service, CAMWATER, to make up for water shortage in Bertoua by promoting the access to drinking water for the population, his policies are faced with the population's low income and old installations of some customers.
However, creating and managing standpipes as part of the rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system is an endeavour to be encouraged as a way to solve the city's water problems. A number of standpipes, including 15, are non-operational in areas where they could be useful to the population. This is caused by the absence of service providers able to provide this service. Collaboration between CAMWATER and Bertoua 1 and Bertoua 2 councils would help to alleviate the problems of accessing drinking water in that, the council would take over the management of these standpipes.
Building boreholes equipped with human-powered pumps are difficult to maintain, as they get bad 2-3 years later, or even less. The budgets allocated to this policy could be used to subsidise social connections for the disadvantaged/poor or to finance the construction of standpipes in areas where water-borne diseases are caused by the lack of adequate water points.
According to OECD's principles, water governance is said to be effective when it helps to resolve main water-related challenges by combining bottom-up and top-down processes while fostering constructive relations between the state and society. It is considered inefficient if it generates excessive transaction costs and does not meet local needs.
Although CAMWATER, in managing its daily activities, seeks to recover expenses related to operating and investment costs, we should not forget that CAMWATER was created by Cameroon's government to promote access for all, without discrimination, to safe, drinking water which is a vision shared by the councils. If these actors work together on the ground, policies would be more coherent and adapted to local conditions. This adaptation will significantly impact the operation of the district hospital, operating without a drinking water supply. It will also considerably reduce the budgets allocated to these policies (CAMWATER projects financed but with mixed results, insufficient



Source **:** *OCDE (2015), principes de l'OCDE sur la gouvernance de l'eau.*

Figure 13 **:** *Principes de l'OCDE pour l'efficacité de la gouvernance de l'eau*

budgets for equipment maintenance by councils) and optimise them.

The ineffectiveness of policies in Bertoua mainly stems from principles 1 and 2.

Principe 1 : Although the roles and responsibilities of various water sector actors are clearly defined, coordination among them remains a determining factor in the effectiveness of water governance in the East.

Principe 2 : Water governance does not seem to reflect local conditions, given inequalities in access and the persistence of waterborne diseases. The coordination of stakeholders would enable water to be managed in a controlled way, at appropriate scales within the framework of integrated systems of basin governance.

RECOMMENDATIONS

The right to drinking water and sanitation is a human right essential for the full enjoyment of life and the exercise of all human rights (A/RES/64/292). States are called upon to work towards universal access to water and sanitation for all without discrimination, while giving priority to those who need it most. The following recommendations are intended to strengthen water governance effectiveness in the region in order to make water available, accessible, affordable, acceptable and of good quality.

1- The Ministry of Water Resources and Energy (MINEE)

- Work towards the development of a legal framework for cooperation between CAMWATER's regional delegations and the Decentralised Territorial Collectivities (DTCs), who are main ground actors in the implementation of water-related policies.
- Reinforcing the effectiveness of the rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system by financing a social connection phase for drinking water supply in Bertoua.
- Work towards extending the network to neighbourhoods not covered by it.
- Work towards building standpipes in neighbourhoods with low incomes.

2-The Ministry of Territorial Administration (MINAT)

As the President's direct representative in the subdivision, the Subdivisional Officer is responsible for ensuring the smooth running of activities in his administrative area. However, his impact on the management of water-related complains is not very significant, as these complains are channelled to the Divisional Officer via administrative procedures that do not bear immediate fruit. To remedy this situation, we suggest MINAT should:

- Give sub-divisional officer the power to intervene in the resolution of water-related disputes.
- Draft, in collaboration with MINDDEVEL, MINEE and MINJUSTICE, texts providing a better framework for water supply, collaboration between stakeholders and simplifying procedures to resolve water-related conflicts.

3- MINISTRY OF HEALTH (MINSANTE)

To strengthen the results of cooperation between the Ministry of Health (MINSANTE), the Ministry of Water Resources and Energy and the Ministry of the Environment in the area of water, we suggest that MINSANTE:

- Should provide regions/departments with laboratories for microbiological analysis of water.
- Should provide the Bertoua 2 district hospital with a drinking water supply.
- Should fund awareness-raising campaigns in Bertoua 1er and Bertoua 2er health areas on waterborne diseases.
- Should build the capacity of awareness-raising staff.

4- The French Development Agency (AFD) and the European Bank for Reconstruction

and Development (EBRD).

The rehabilitation, reinforcement and extension project of the Bertoua drinking water supply system financed in 2017 has improved drinking water supply in Bertoua. However, this improvement does not benefit all citizens equally, which creates among the population, a feeling of exclusion. Remedying this situation would imply strengthening constructive relations between the State and society through:

- Support from the Ministry of Water Resources and Energy (MINÉE) in financing a social connection phase in Bertoua and the construction of standpipes in neighbourhoods with low incomes, such as Ngaikada and Bertoua 2.
- Involve civil society in project follow-up and evaluation.

5- Camwater's Regional Delegation for the East

The facilities put in place by CAMWATER's Regional Delegation for the East.to provide the population with drinking water are commendable. However, the implementation of the following practices would strengthen the impact of this institution in the daily lives of the population:

- **Strengthening cooperation with councils.**

This cooperation will make possible the adoption of concerted policies and will ease their implementation for the well-being of the Bertoua 1er and Bertoua 2e population.

- **The construction of standpipes in the Bertoua 2 and Ngaikada neighbourhoods.**

These standpipes could be managed by traditional or clan chiefs in these neighbourhoods. This action will help empower the population and involve them in water governance in the region. These standpipe managers could act as community relays in communicating the institution's policies.

- **Working with administrative authorities (Sub-divisional Officers) to supervise the management of standpipes.**

Collaboration with the administrative authorities will ensure that the traditional authorities and clan heads in these neighbourhoods are properly empowered.

- **Reinforce communication on the facilities put in place by the institution for connection to the supply network and the harmful effect of some installations.**

The absence of social media accounts to communicate on activities carried out by the Regional Delegation for the East considerably impacts on the access to water-related information in the region. However, communicating via messages from network operators like Orange and MTN would help reach all the population, hand around information and strengthen the institution's brand image.

- **Set up facilities to change galvanised pipe installations.**

6- The Bertoua 1er and Bertoua 2em City Councils

The lack of funds to maintain these wells and boreholes equipped with human-powered pumps is a real problem for the implementation of water-related activities by the council. While it is true that these facilities are necessary, they are also fragile and not do not last. The city council builds wells and boreholes in areas not covered by the public water supply network. However, the fight against the spread of waterborne diseases and the population's quest for its well-being may allow for :

- Cooperation with CAMWATER in implementing drinking water policies.
As actors pursuing the same goal which are providing the population with safe and drinkable water and eradicating waterborne diseases in the region, this collaboration will help optimise water-related costs and policies in the region.

- Funding network extension to areas not covered by the public network.
This funding will ease the covering of areas far from the central drinking water supply network.

- Subsidising social connections on an annual basis in areas with high risk of waterborne diseases.
The lack of money is one of the main reasons given by the population surveyed. Subsidising these social connections will help the well-off benefit from home connections and fully enjoy the right to drinking water.

- Supervise the construction of drinking water points.
Uncontrolled water point constructions in neighbourhoods surveyed and the consumption of uncontrolled water (microbiological analysis) are factors that are detrimental to the population's well-being. The population seem unaware of the legal and health dangers to which they are exposed.

- Organise educational talks and annual forums. These activities ease the sharing of information, a prerequisite for involving the population in water governance.

- Involve the population in water governance.

CONCLUSION

Water governance is said to be effective when it helps to resolve main water-related challenges by combining bottom-up and top-down processes while fostering constructive relations between the state and society. It is considered inefficient if it generates excessive transaction costs and does not meet local needs (OECD,2015). Observation of the mixed results of the rehabilitation, reinforcement

and extension project of the Bertoua drinking water supply system funded to the tune of 15.8 billion happens not to be the magic bullet it was expected to be, solving the drinking water access problem in Bertoua. Added to that, funding decentralised territorial collectivities to build water supply facilities, which are not sustainable and require additional funding for maintenance, does not solve the plight of the less well-off, who are exposed to stress and waterborne diseases. However, since every system hosts the seeds of its own destruction, the chaotic system in which the Bertoua underprivileged are immersed offers potential solutions to be exploited by actors on the ground. These solutions essentially lay on the collaboration of local actors and CAMWATER.

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