Санкт-Петербургский государственный университет

NYANFEU SAMEGNI ANGE BRENDA

Выпускная квалификационная работа

WATER CRISIS IN AFRICA: CASE OF CAMEROON

Уровень образования: магистратура Направление 41.04.05 *«Международные отношения»* Основная образовательная программа ВМ.5569 *«Международные отношения (на английском языке)»*

Научный руководитель: Профессор кафедры мировой политики
Добронравин Николай Александрович
Рецензент:

Сиим Анна Юрьевна, старший научный сотрудник,
Федеральное государственное бюджетное учреждение науки Музей антропологии и этнографии им.Петра Великого (Кунсткамера) Российской академии наук

Санкт-Петербург
2024

DEDICATION

I dedicate this thesis to the SAMEGNI family. I love you all unconditionally.

ACKNOWLEDGEMENT

It would be difficult to thank everyone who contributed to this work all enough I owe them a lot of gratitude for their effort. I am very indebted to my thesis supervisor, Professor Dobro Ravin Nikolai Alexandrovich, for his patience, concern, understanding and support. My sincere thanks also go to Professor Yarygin Grigory Olegovich for his encouragement and Professor Tsetkova Natalia for her professional but gentle criticism and corrections. To remind them that without their immense contribution, this work would not have been possible. I would like to thank my lovely family. In particular my sister (Soraïda) and my brother (Jordan). The strong bond we share has only been of support and encouragement. I would like to thank my dad; He provided me with practical support and advice when things seemed too difficult and demanding for the first time and gave me a considerable level of insight and criticism on my evolution. Finally, I would like to express my sincere gratitude to all those people there for their invaluable support and advice throughout my research on the water crisis in Cameroon. Their expertise and help have been instrumental in helping me better understand the complexities of this important issue. I am also grateful for the opportunity to shed light on this crucial topic and to propose potential solutions to deal with the water crisis in Cameroon. Thank you to everyone who has contributed to my research and helped me along this journey. In addition, I give all glory, honor and praise to God for this wonderful opportunity. Always grateful.

ABSTRACT

On the topic: **Water Crisis in Africa (the case of Cameroon)**

This thesis aims to investigate the water crisis in Africa, with a particular emphasis on the case of Cameroon. The research methodology proposed for this study includes a combination of qualitative and quantitative approaches to provide a global understanding of the issue. The study will target a diverse population, including rural and urban households, local communities, government agencies and NGOs involved in water management. Data collection methods will include interviews, questionnaires and field observations to gather a variety of perspectives on the water crisis. The research instruments will be carefully developed to ensure the validity and reliability of the data collected. The data analysis will be carried out using appropriate methods for qualitative and quantitative data. Ethical considerations will be paramount throughout the research process to protect the rights and privacy of participants. By following this robust methodology, this study aims to provide valuable information on the water crisis in Africa, in particular in Cameroon, in order to inform effective solutions and interventions to solve this critical problem.

Author of the work: **Nyanfeu Samegni**

Angel Brenda

TABLE OF CONTENTS

LIST OF ABREVIATIONS

- NGO: Non-Governmental Organization
- AEPA: Association of Agricultural Policy Economists
- WHO: World Health Organization
- DSCE: Declaration of Strategy for Growth and Employment
- FAO: Food and Agriculture Organization of the United Nations
- GWP: Global Water Partnership
- CCI: Chamber of Commerce and Industry
- CTD: Decentralized Technical Unit
- UNICEF: United Nations Children's Fund
- SNEC: National Water Company of Cameroon
- WSP: Water and Sanitation Program
- CMEC: Cameroonian Mines and Quarries Company
- CDE: Cameroonian Water Company
- MINSANTE: Ministry of Public Health
- PANGIRE: National Program for Integrated Water Resources Management
- SCANWATER: Data Collection and Analysis System on Water in Sub-Saharan Africa
- GDP: Gross Domestic Product
- MINEE: Ministry of Water and Energy
- CAMWATER: National Water Company of Cameroon
- ECOSANTE: Health Economics
- JMP: Joint Monitoring Program
- BFP: Staff Training Budget
- UN: United Nations
- SWOT: Strengths, Weaknesses, Opportunities, Threats
- INS: National Institute of Statistics
- UNESCO: United Nations Educational, Scientific and Cultural Organization
- SDGs: Sustainable Development Goals
- UNDP: United Nations Development Program
- PPP: Public-Private Partnership
- ACDE: Cameroonian Association for Enterprise Development
- TPSF: Tanzania Private Sector Foundation

INTRODUCTION

The water crisis is a major challenge that many countries around the world are facing. In particular, Cameroon, located in Central Africa, is facing critical problems related to access to drinking water and sanitation. This water crisis has profound repercussions on the country's health, education, economy and environment, directly affecting the quality of life of its inhabitants. In this thesis we propose to analyze in depth the water crisis in Cameroon, examining the underlying causes of this complex problem, the consequences on the population and the environment, as well as current initiatives aimed at remedying it. By highlighting the challenges and opportunities related to water management in this specific context, this research work aims to raise awareness of the crucial issues related to access to drinking water and to encourage concrete actions to improve the situation. Based on an in-depth analysis of available data, case studies and testimonies from local experts, this thesis offers a complete overview of the water crisis in Cameroon and proposes strategic recommendations for sustainable management of water resources in the country. By exploring the social, economic, political and environmental dimensions of this problem, this study aims to contribute to a better understanding of the issues related to water in Cameroon and to encourage innovative solutions to meet this crucial challenge.

This thesis aims to raise a collective awareness of the vital importance of water for the sustainable development of Cameroon and to inspire concerted actions to guarantee equitable access to drinking water for all citizens. By working together to meet this common challenge, it is possible to transform the water crisis into an opportunity for progress and development for Cameroon and its population

RELEVANCE OF THE STUDY AND THESIS PROPOSAL

- ✓ **Relevance of the study**

The study on the water crisis in Africa, in particular in Cameroon, is very relevant because it highlights the challenges that the country faces in terms of access to drinking water and sanitation. This crisis has major repercussions on public health, the economy and the environment. By understanding the causes and consequences of this crisis, solutions can be proposed to improve the situation and guarantee sustainable access to water for all Cameroonian citizens. By highlighting these issues, it is possible to raise awareness among the authorities and the population of the importance of guaranteeing sustainable access to drinking water for all.

* Humanitarian impact: Access to safe drinking water is a fundamental human right, and its absence can have serious consequences on public health, in particular in terms of waterborne diseases.

By addressing the water crisis in Cameroon, this study can contribute to improving the well-being and quality of life of its population.

* Environmental sustainability: Sustainable water management is crucial for the preservation of ecosystems and biodiversity. By examining the water crisis in Cameroon, this study can raise awareness of the importance of protecting water resources and promoting sustainable practices.

* Social and economic development: Adequate access to water is essential for economic development, agriculture and industrial activities.

By analyzing the water crisis in Cameroon, this study can shed light on the socio-economic implications of water scarcity and the need for strategic interventions to promote growth and prosperity.

* Policy Implications: Understanding the root causes of the water crisis in Cameroon can inform policy-making processes and guide the implementation of effective water management strategies. This study can provide valuable information to decision-makers, stakeholders and development agencies working to address water-related challenges in the country.

* Global relevance: The water crisis is a global problem that transcends borders and affects people around the world. By focusing on Cameroon, this study contributes to the broader discourse on

water management, sustainability and resilience in the face of climate change and other environmental challenges. In summary, the study on the water crisis in Cameroon is relevant not only for the country itself but also for the broader context of global water security and sustainable development. By examining this critical issue in depth, this study aims to raise awareness, stimulate dialogue and inspire action towards a safer and more equitable future for all.

- ✓ **Thesis proposal**

The water crisis in Africa is a major problem that impacts the daily lives of millions of people, including in Cameroon. This thesis will contribute to the understanding of the water crisis in Africa, highlighting the specific case of Cameroon. The results of this research can serve as a basis for the development of effective public policies aimed at solving this crucial problem and ensuring sustainable access to drinking water for all. This thesis will propose practical recommendations for political decision-makers, NGOs and local actors in order to face the water crisis in Cameroon and Africa as a whole. It will thus contribute to raising awareness of the crucial importance of guaranteeing equitable access to drinking water for all citizens.

THE PROBLEM

Water is a vital resource essential to life, but many countries in Africa, including Cameroon, are facing a water crisis that threatens the health, well-being and sustainable development of populations. This study will focus on the in-depth analysis of the challenges, causes and impacts of the water crisis in Cameroon, highlighting the key factors that contribute to this critical situation. By examining the social, economic and environmental impacts of the water crisis, as well as current initiatives aimed at remedying it, this research aims to propose recommendations for sustainable water management in the country. Therefore, we will identify the main factors contributing to the water crisis in Cameroon, including problems such as pollution, insufficient infrastructure, population growth, climate change and governance, Explore the social, economic and environmental impacts of the water crisis on different segments of the population in Cameroon, including vulnerable communities and marginalized groups, Evaluate current initiatives and interventions aimed at addressing the water crisis in Cameroon, including government policies, NGO programs and community initiatives, Investigate perceptions, attitudes and the behaviors of stakeholders involved in water management and conservation in Cameroon, including government officials, NGOs, local communities and private sector actors, Propose recommendations and strategies for sustainable water management and conservation in Cameroon, taking into account the socio-economic and environmental context of the country. By thus defining the scope of the study, the research will provide a complete analysis of the water crisis in Cameroon. The water crisis in Cameroon is a complex problem that results from several interconnected factors such as rapid population growth, deforestation, pollution, climate change and inadequate management practices. These factors have led to a decrease in the availability of drinking water, conflicts related to access to water resources, negative impacts on public health and the environment, as well as an increase in the costs associated with the supply of drinking water. The thesis highlights the importance of strengthening water governance in Cameroon by promoting sustainable management of water resources, by strengthening local capacities for better water management, by encouraging regional cooperation for integrated watershed management, and by sensitizing key actors on the urgency of acting to ensure equitable access to drinking water for all Cameroonian citizens. In summary, the thesis highlights the urgency of acting to meet the challenges related to the water crisis in Cameroon by proposing concrete recommendations for sustainable water management in the country.

The key research question that must be answered in this topic is: How can sustainable water management practices be effectively implemented in Cameroon to face the water crisis and guarantee equitable access to safe drinking water for all citizens?

HYPOTHESIS

In Cameroon, the water crisis is a complex issue with various factors contributing to the problem. Some of the key aspects that we can hypothesize in the water crisis in Cameroon include:

- Limited access to drinking water sources: For example, many communities in Cameroon do not have access to clean and safe drinking water sources. This is often due to inadequate infrastructure, poor water quality and contamination of existing water sources. By investing in innovative water treatment technologies, Cameroon could improve the quality of its water supply and reduce the risks related to contamination.
- The distribution of water resources in Cameroon is uneven, with some regions having better access to water than others. This disparity can lead to conflicts over water rights and exacerbate the water crisis in certain areas. By promoting regional and international cooperation for the shared management of water resources, Cameroon could strengthen its capacity to face the challenges related to access to water and to ensure an equitable distribution of water resources.
- Climate change has led to increased variability in rainfall patterns in Cameroon, leading to more frequent droughts and water shortages. This has a significant impact on agriculture, food security and access to water for humans and livestock. By setting up training and awareness-raising programs on the importance of preserving water resources, Cameroon could encourage more sustainable water management by its population.
- Pollution and contamination, in this case Industrial activities, urbanization and agricultural practices have led to pollution and contamination of water sources in Cameroon. This poses risks to the health of the population and puts a strain on the already limited drinking water resources.

By putting in place policies and measures for sustainable water management, such as the reuse of wastewater, raising awareness of water conservation and improving water distribution infrastructure, Cameroon could overcome its water crisis and guarantee equitable access to safe drinking water for its population.

OBJECTIVES

This work aims to show that access to drinking water and sanitation for people in Cameroon can be improved, given the difficulties they experience on a daily basis.

- present and analyze the biophysical and human conditions that influence access to

- Present and analyze the biophysical and human conditions that influence the access to drinking water and sanitation of the populations in Cameroon.

- identify on the one hand the actors, analyze the problems and the consequences induced by the

- Identify on the one hand the actors, analyze the problems and the induced consequences of the management and propose on the other hand the strategies and practical actions for optimal access to drinking water and sanitation for the populations in Cameroon.

- Increase access to clean and safe drinking water for all citizens in Cameroon

- Improve the water infrastructure, including pipelines, pumps and treatment facilities.

- Improve coordination and collaboration between government agencies, NGOs and other stakeholders to effectively address the water crisis.

- Ensure an equitable distribution of water resources in all regions and communities of Cameroon.

- Mobilize resources and financing to support water-related projects and initiatives in Cameroon.

LITERATURE REVIEW

International meetings aimed at finding viable and sustainable solutions to the problem of access to drinking water and sanitation testify to the recognition of the importance of this resource on human health. Thus, the problematic of the AEPA has been the subject of several scientific works. The exploratory phase in the various libraries and the Internet made it possible to consult books, theses, articles and reports dealing with this question. This state of play on the theme of water and sanitation has made it possible to highlight the limits of previous work which have been grouped into three research axes, namely:

- access to drinking water and sanitation;

- effects of water quality and the sanitation system on health, the economy and the environment;

- management of drinking water supply networks and sanitation systems.

➢ Access to drinking water and sanitation:

Around the world, people are experiencing enormous difficulties in accessing an improved water point and a comfortable sanitation system. According to the joint WHO/UNICEF report (2010), one billion people in the world do not have access to an "improved" source of drinking water and 2.6 billion do not have access to basic sanitation. Elong et al. (2011), believe that water supply arises in terms of scarcity or availability, quantity and quality. Large disparities exist in water consumption around the world. From the work of SEVES (2013), it emerges that the quantities of water available on the European and African continents are very unevenly distributed. In France, 150 liters of water are used per person per day. Each household has about 4 people, a total of 600 liters of water used per day in a family. Water is available directly there, i.e. 0 km traveled. On the other hand, in Africa, this amount is reduced to 10 liters per person per day, or 60 liters for a family of 6 people. The populations walk a distance of about 5 km, to draw the "drinking" water, with a container of 20 liters of water on the head. In these conditions of inequality, the WHO /UNICEF (2007) estimate that wells and boreholes constitute the main source of food for 24% of the urban population in Africa. In this continent, 2 out of 5 people do not have access to drinking water, which corresponds to the lowest access rate in the world. The majority of those who do not have access to these services live far from the distribution network (BM et al., 2008). In small centers and disadvantaged neighborhoods of large cities, rivers, wells, hydrants or the private tap

constitute the common sources of water supply. Depending on the different uses of water, households are attached to at least two modes of supply (Le Bris, 1998).

With the exception of Douala and Yaoundé, where 80% of the population have access to an improved water source, the problem of access to drinking water is worrying in the villages and other cities of Cameroon. Less than 40% of the inhabitants in rural areas and 65% in medium-sized cities have access to quality drinking water (Fonteh et al., 2003 cited by Nanfacket al., 2014). Several factors contribute to making it difficult for populations to have access to drinking water. It is about human and biophysical constraints. Poverty, the uncontrolled expansion of cities, the galloping demography, the retreat of public policies in terms of social facilities and the decline in the purchasing power of populations following the economic crisis, are all constraints that explain the difficulties of access to drinking water in developing countries (Tchotsoua et al. (1999), Bignoumba (2007), Djoussi (2008), Cihunda (2009), French Partnership for Water (2014), Yemmafouo et al. (2014)). Moreover, in developing countries, the deficit supply of electrical energy is becoming more and more a major constraint for the production, treatment and distribution of drinking water (Guéye, 2012).

In Cameroon, the low household income, the weakness of the regulatory framework, the financing problem and the control of the management of the works are at the origin of the difficulties of access to water and sanitation (AFD, 2010-2012). Moreover, Assongmo (2002), analyzing the marginal neighborhoods of the Yaoundé agglomeration, comes to the conclusion that land insecurity is a brake on investments by SNEC, the water concessionaire.

- **Effects of water quality and the sanitation system on health, the economy and the environment:**

There are many economic losses and the health impact due to poor sanitation. According to WSP (2012), quoted by the PS-Uae (2013), 18 African countries lose about $ 5.5 billion / year, or between 1% and 2.5% of GDP. UNICEF/ WHO (2006), affirm that the ingestion of unsafe water, the shortage of hygiene and the lack of access to sanitation together contribute to 88% of deaths caused by diarrheal diseases, or more than 1.5 million deaths out of 1.9 million children under the age of 5 who succumb to diarrhea each year. In Cameroon, MINEE studies (2012) reveal that the inadequacy of sanitation systems and water supply, poor water quality and the inability of populations to adopt the correct hygiene rules are factors that increase the risks of

morbidity and mortality related to waterborne diseases (13%). The work of Mougoué (2012) on popular participation in the Mingoa watershed in Yaoundé shows that in this environment, on average, a well is surrounded by 8 latrines. The proximity of the sources, the wells with the toilets of ease facilitates the horizontal and vertical transfer of pollutants, which explains the permanent contamination of the water table. Indeed, the distance between the water supply structures (well, source) and the toilets or toilets rarely exceeds 15 m (Bemmo et al., 1998). This observation is also made in the Bamoun plateau, where groundwater is contaminated by cesspools, the majority of which are bottomless (Mfonka et al., 2015). About 70% of household health expenditures concern diseases caused by inadequate access to water and sanitation (MINEE, 2012). In the Municipality of Santchou, the consumption of water from wells and rivers induces diarrheal diseases whose treatment cost is estimated at between 10,000 and 15,000 CFA francs (Lako, op.cit.). According to the French Red Cross (2009), 30% of recurrent diseases are linked to poor water quality, poor sanitation and defective hygiene. The United Nations (2012), cited by the French Water Partnership (2014), estimates that every day, 7,500 people, including 5,000 children under the age of five, die as a result of lack of sanitary facilities. Children are the most vulnerable to the harmful effects of unsafe water and sanitation problems. For Olivier (2010), morbidity, the drudgery of water or the absence of toilets have negative consequences on education, income and people's well-being. The solution to AEPA's difficulty lies in a good management of the structures in place.

- **Management of drinking water supply networks and sanitation systems:**

Kam (2013) dealing with the management of hydraulic infrastructure in rural drinking water supply projects in Côte d'Ivoire believes that the limited participation of populations in the simple consultation of local representatives of the administration (prefect and sub-prefect) and the information of village leaders was at the origin of the failure of the Nord-Est and Tanda projects. The non-appropriation of the works by the beneficiaries has led to their poor maintenance. These works, once broken down, were abandoned very early. In this logic, the work of Elong et al. (2015) shows that failure to take into account the aspirations of the population in a community project can lead to poor management of water points. The lack of appropriation of drinking water supply works in the villages of the Commune of Bangangté is explained by the fact that the populations undergo the installation of these works without real consultation (Tchounga, 2015). In Cameroon in 2007, 21.2% of households are informed of CAMWATER network extension projects against only 3.4% who are involved or consulted. 44.6% of households are informed about the construction projects of motorized boreholes/wells while 15.8% are involved or consulted (INS, 2008).

The lack of information-education-communication and financial resources does not favor a good appropriation of the works built for the supply of drinking water by the populations. However, consultation and the involvement of populations at all levels of realization of village hydraulic projects make it possible to better integrate the socio-cultural dimension during the development and implementation of projects (Yélognissè, 2007). Ngnikam et al. (2011) support this idea by showing that the direct contribution of the beneficiaries, however modest it may be, is the main guarantee of the sustainability of works in working-class neighborhoods in urban areas. However, the contribution set by the initiators of the project must take into account the ability to pay of the populations at the base. Based on observations made in the Mingoa watershed in Yaoundé, Mougoué et al. (2015), affirm that when a resident has participated in one way or another in the installation of equipment, he personally ensures to preserve it from any act of vandalism or voluntary deterioration. In Cameroon, the logic from the top down is practiced by the institutional actors of water. This logic, which disregards the knowledge that the populations have of their own terroir and the know-how that they have been able to develop themselves in the face of the difficulties encountered on a daily basis, has led to failures and to the abandonment of the drinking water supply works carried out (Djeuda et al., 2001). However, the daily management of water and sanitation services must involve a very large number of local actors (user associations, management committees, small local operators, elected or not district officials). These different managers must maintain a close relationship with the stakeholders in order to maintain the balance of the system (UNESCO et al., 2004). Cameroon's vision by 2035 is in line with that made by world leaders to provide everyone with access to basic infrastructure and preserve a sustainable environment. Thus, Cameroon has adhered to the SDG and is committed to continuing implementation until 2020 within the framework of the DSCE. The target is to increase the access rate to drinking water to 75% by 2020 and that of access to sanitation infrastructure to 60% (INS, 2017). To strengthen the AEPA, the Cameroonian state, through the MINEE, signed a service contract with the Chinese company CMEC and began the procedure for applying for financing for the drinking water supply project for the city of Yaoundé from the Sanaga (2013). He has also committed to the construction of 200 human-powered boreholes and 10 latrines in each of the Regions of Cameroon. Their management has been delegated to the municipalities as part of the support for decentralization (MINEE, 2014). However, improving access to drinking water is not simply limited to the construction or one-off renovation of equipment. To this, it is necessary to associate a reflection on the establishment of an efficient and sustainable water service which will guarantee the operation of the equipment over the long term (PS-Water, 2012).

It emerges from this state of play that several authors have focused on the problem of access to drinking water and sanitation around the world. The consideration of the anthropological aspect in the improvement of the AEPA has only been touched on. In addition, the authors proceed very little by analyzing the biophysical environment to explain the difficulties of access to drinking water. The originality of this thesis also lies in the recourse to the ECOSANTE approach which offers municipal decision-makers a technique to find practical solutions for AEPA of the populations of the department of Ndé in the long term in particular and those of Cameroon in general. Moreover, Cameroon is in the midst of a decentralization process. The implementation of this mode of governance within the framework of the management of water resources and sanitation systems is an opportunity that can contribute to the achievement of the SDGs in this sector.

- **The source base of the study**

The information provided in the previous answer is based on a combination of sources, including reports from international organizations such as the World Health Organization (WHO) and UNICEF, as well as research studies and articles on access to water in Cameroon. These sources provide valuable information on the challenges and factors affecting access to drinking water in the country. In addition, data and statistics from government reports and academic publications were used to support the analysis of the current situation in terms of access to water in Cameroon. It is important to note that the information presented is a general overview of issues related to access to water in Cameroon and may not cover all aspects of the topic. For more detailed and precise information, it is recommended to consult the original sources cited in this answer or to carry out other research on the subject.

METHODOLOGY

The water crisis in Africa, including Cameroon, is a crucial problem that has major implications for public health, economic development and environmental sustainability. The relevance of this study is therefore undeniable. The proposed methodology seems appropriate to address a complex problem such as the water crisis. By combining qualitative and quantitative approaches, it will be possible to obtain a holistic view of the situation. The methodology of this work is based on the collection of data from secondary and primary sources, to collect the data necessary for the elaboration of this thesis. To validate or disprove research hypotheses and theories, quantitative data combined with qualitative data were collected and evoked whenever the need arose. We will focus on data collection such as the report of the World Health Organization (WHO) and UNICEF on access to drinking water and sanitation in Cameroon, the Reports of the United Nations Development Program (UNDP) on water management and the Sustainable Development goals in Cameroon, Academic studies on the water crisis in sub-Saharan Africa, in particular those on Cameroon, press articles and reports on water-related challenges in Cameroon, published in local and international newspapers, publications from non-governmental organizations (NGOs) and international organizations working on the issue of water in Africa, such as WaterAid or the Food and Agriculture Organization of the United Nations (FAO).

We will have the study population because, it is important to clearly define the target population of the study, which could include rural and urban households, local communities, government agencies and NGOs involved in water management. To better understand this thesis, we will divide our work into three parts which will each comprise two chapters.

So, keeping this track, the first part entitled the Context and the importance of the water crisis in Africa with, in this case, Cameroon, which would be characterized by two chapters namely chapter 1: Theoretical framework of water crisis in Africa and chapter 2: Analysis of the water situation in Cameroon. The second part which is Diagnosis and evaluation of the water crisis in Cameroon which would be argued by chapter 3: Socio-economic and environmental impacts of the water crisis and chapter 4: Factors influencing access to drinking water and sanitation in Cameroon. Finally, we will have the third part which is solutions to overcome the water and sanitation crisis in Cameroon.

PART I: THE CONTEXT AND THE IMPORTANCE OF THE WATER CRISIS IN AFRICA WITH CAMEROON AS A CAS.

The water crisis in Africa is a complex problem that is influenced by various factors, including climate change, population growth, poor infrastructure and lack of access to drinking water sources. Africa is the most water-stressed continent in the world, with many countries facing severe water shortages and inadequate sanitation facilities. Climate change is exacerbating the water crisis in Africa, leading to more frequent and severe droughts, floods and other extreme weather events. This has a significant impact on the availability and quality of water, making it difficult for communities to access safe and reliable water sources. Population growth is also a major factor in the water crisis in Africa. As the population continues to increase, the demand for water increases, putting pressure on already limited water resources. In many parts of Africa, inadequate infrastructure and poor water management practices further exacerbate the problem, leading to inefficient water use and contamination of water sources. Access to safe drinking water is a fundamental human right, but millions of people in Africa do not have access to safe drinking water and sanitation facilities. This has serious implications for public health, as contaminated water can lead to waterborne diseases such as cholera, typhoid and dysentery. Addressing the water crisis in Africa requires a multifaceted approach that includes improving water infrastructure, promoting sustainable water management practices, improving access to drinking water sources and raising awareness of the importance of water conservation. International cooperation and investment are also essential to address the water crisis and ensure that all Africans have access to safe and reliable sources of water. The water crisis in Africa is of crucial importance due to its considerable impacts on public health, economic development, food security and the general well-being of communities across the continent. We note some key reasons why the water crisis in Africa is important:

* Public Health: The lack of access to drinking water and sanitation facilities contributes to the spread of waterborne diseases, resulting in high rates of illness and mortality, especially among children. Water-related diseases such as cholera, typhoid and dysentery are major public health problems in many African countries.

* Economic Development: Water scarcity and poor water quality hinder economic development in Africa. Without reliable access to water for agriculture, industry and domestic use, communities struggle to meet their basic needs and develop sustainable livelihoods. The water crisis also affects

productivity, as people spend a lot of time and effort collecting water instead of engaging in productive activities.

* Food Security: Agriculture is a major source of income for many people in Africa, and water scarcity poses a threat to food security. Insufficient water for irrigation, livestock watering and food processing can lead to poor harvests, reduced agricultural productivity and food shortages, exacerbating hunger and malnutrition in the region.

* Environmental impact: The water crisis in Africa has environmental consequences, in particular the depletion of water sources, the degradation of ecosystems and the loss of biodiversity. Climate change is further intensifying these impacts, affecting the availability of water and exacerbating environmental challenges such as desertification and deforestation.

* Social equity: The water crisis disproportionately affects vulnerable populations, in particular women, children, the elderly and people living in rural areas or informal settlements. In many cases, marginalized communities face obstacles to accessing drinking water and sanitation services, perpetuating social inequalities and hindering their overall well-being.

* Regional stability: Water scarcity can also contribute to conflicts over shared water resources, leading to tensions between countries or communities. Effective management of water resources and the promotion of cooperation between stakeholders are essential to maintain regional stability and prevent conflicts related to access to water.

Addressing the water crisis in Africa requires coordinated efforts at local, national, regional and international levels to improve water governance, invest in infrastructure, promote sustainable water management practices and guarantee equitable access to drinking water for all. By prioritizing water security and sustainability, African countries can mitigate the impacts of the water crisis and build resilient communities that thrive in the face of future challenges.

Cameroon, like many other African countries, is facing significant challenges related to water scarcity, poor water quality and insufficient access to drinking water and sanitation services. The water crisis in Cameroon is an urgent problem with considerable implications for public health, economic development, food security and environmental sustainability. Some key aspects of the water crisis in Cameroon and its importance in the wider African context:

Impact on public health: In Cameroon, the lack of access to drinking water and sanitation facilities contributes to the spread of waterborne diseases such as cholera, typhoid and diarrhea. These diseases represent a significant burden on public health, especially in rural areas and informal settlements where access to drinking water is limited. Improving the quality of water supply and sanitation infrastructure is crucial to reduce disease transmission and improve overall public health outcomes in Cameroon.

Economic Development Challenges: Water scarcity and poor water management practices in Cameroon hinder the economic development and livelihood opportunities of many communities. Agriculture, which is a major sector of the Cameroonian economy, depends heavily on water for irrigation, livestock watering and food processing. Insufficient water resources can lead to poor harvests, reduced agricultural productivity and food insecurity, affecting farmers' livelihoods and exacerbating poverty in the country.

Environmental concerns: The water crisis in Cameroon has environmental consequences, in particular the depletion of water sources, the pollution of rivers and lakes and the degradation of ecosystems. Deforestation, soil erosion and climate change are further aggravating the water shortage and environmental degradation in the country. Sustainable water management practices are essential to preserve natural resources, protect biodiversity and mitigate the impacts of climate change on the availability of water in Cameroon.

Social equity issues: Access to drinking water and sanitation services in Cameroon is unevenly distributed, with disparities between urban and rural areas, as well as between different socio-economic groups. Marginalized populations, including women, children and Indigenous communities, often face obstacles to access safe drinking water and sanitation facilities, perpetuating social inequalities and hindering their overall well-being. Promoting social equity and ensuring equitable access to drinking water for all are essential to address the water crisis in Cameroon. Regional consequences: Cameroon shares several rivers and transboundary bodies of water with neighboring countries, which makes water management a complex issue with regional repercussions. Cooperation between the countries of the region is crucial for the sustainable management of shared water resources, the prevention of conflicts related to access to water and the promotion of regional stability. By encouraging dialogue and collaboration on water governance issues, Cameroon can contribute to regional efforts aimed at addressing the water crisis and promoting sustainable development in Africa.

The water crisis in Cameroon is a complex problem with important consequences for public health, economic development, environmental sustainability, social equity and regional stability. Overcoming the challenges related to water scarcity and poor water quality requires comprehensive strategies that prioritize sustainable water management practices, invest in infrastructure development, encourage community participation and guarantee equitable access to drinking water for all. By taking preventive measures to deal with the water crisis, Cameroon can strengthen its resilience, improve its livelihoods and build a more sustainable future for its population and the region as a whole.

CHAPTER 1: THEORETICAL FRAMEWORK OF WATER CRISIS IN AFRICA

1. Definition of the water crisis and its challenges in Africa

It is first necessary to define the word "water" which is polysemic. In Africa, it has several meanings depending on the context in which it is used. According to the critical dictionary, "The Words of Geography", water is a liquid composed of hydrogen and oxygen on the scale of the terrestrial globe, following the gathering of gaseous molecules expelled from the first million of years of the formation of the earth. There are several types of water: surface water, groundwater, wastewater and drinking water. Decree n° 2001/165/PM of May 8, 2001 provides a precise definition to surface, groundwater and wastewater. Surface water is runoff water. These are streams, stagnant waters and more generally streams, rivers, backwaters, the waters of lakes, ponds, etc. Groundwater results from the stay in the ground of waters in perpetual displacement in the environment. Their accumulation at depth gives rise to groundwater, some of which, called groundwater tables, are almost flush with the surface. Their level fluctuates depending on the rains that fall in the region. It is this groundwater that supplies wells and springs. Other so-called geological layers are located at a greater depth and are therefore slightly affected by precipitation. The availability of groundwater depends on the geology of the environment, more particularly on the properties of the different geological materials in which the water circulates. Indeed, these groundwater and surface waters constitute the main sources of food for the populations in Cameroon. The dictionary, "The Words of Geography" defines drinking water as water that can be drunk without excessive danger to health. The water is drinkable naturally, or aftertreatment. The

precision on the term excessive is very significant, because the fact that a water is drinkable does not mean that it is free of polluting materials, but that their concentration has been judged low enough not to endanger the consumer's health. According to the scientific encyclopedia, drinking water is water that satisfies a number of characteristics that make it suitable for human consumption. It is a water that offers no inconvenience for the health of the consumer. This quality implies that the water is suitable for all usual household uses, including personal hygiene. Drinking water must meet quality standards that most often concern the following characteristics:

- organoleptic quality: transparency (turbidity), color, smell, flavor;

- physico-chemical parameters: pH, temperature, mineral concentration, conductivity;
- presence of undesirable substances: nitrates, nitrites, fluorine, pesticides and related products;

Microbiological parameters: do not contain harmful bacteria such as coliforms and fecal streptococci (Gilles, 2011). When a water is contaminated by pathogens, it is at the origin of the transmission of waterborne diseases.

➢ Conceptualization of access to drinking water According to WHO (2004), access to drinking water is "the possibility of having at least 20 liters of this liquid per day per person from a safe source within a radius of one kilometer".

Accessibility is a concept that accounts for the greater or lesser ease with which a service can be accessed. Applied to drinking water, it is declined in terms of availability of the resource, permanence, distance separating the household from its water point and quality. It is through the quality of the water consumed and the quantities used that domestic uses of water can have consequences on the health of the populations of Cameroon.

With the adoption of the SDGs, an individual therefore has access to drinking water when he has quality water and in sufficient quantity to cover his needs (drinking, cooking, body hygiene, etc.). In addition, the collection time is set at 30 minutes or less (round trip) including the queue (UNICEF/WHO, 2017). In the analysis of access to drinking water, interest will be paid to the distribution of water points, their typology, the distances traveled by households and the volumes of water consumed in the household per day and per person. The water crisis refers to a situation where there is a shortage of clean, safe and reliable water supply for human consumption, sanitation, farming, industry and environmental sustainability. It encompasses problems such as water scarcity, inadequate access to drinking water and sanitation services, poor water quality, water pollution, overexploitation of groundwater, inefficient water management practices and the unequal distribution of water resources between different populations. The water crisis has important implications for public health, economic development, social equity, environmental sustainability and regional stability, highlighting the urgent need for sustainable water management strategies and investments to meet these challenges and guarantee access to drinking water for all. The water crisis in Africa is a major and complex problem that poses many challenges

for the continent. Water scarcity, lack of adequate infrastructure, poor water quality, the effects of climate change, inadequate governance and management, poverty and inequalities, as well as transboundary problems are all challenges to be met. These factors contribute to a situation where many populations do not have access to clean water for drinking, washing or farming. To face these challenges, a holistic approach is needed, integrating water management with broader development objectives such as poverty reduction, health improvement, environmental sustainability and climate resilience. Investments in water infrastructure, capacity building, technological innovation and political reforms are necessary to guarantee sustainable access to clean water for all Africans. Cooperation and coordination between riparian states are also essential for the effective management of shared water resources and for preventing water-related conflicts.

2. Factors contributing to the water crisis in Cameroon.

The water crisis in Cameroon is influenced by a combination of factors, in particular an unequal distribution of water resources. The country has abundant water resources, but these are unevenly distributed over the territory. This leads to disparities in access to clean and safe water, with rural areas often facing greater challenges than urban areas. In addition, the inadequacy of infrastructure is another key factor. Many regions of Cameroon lack adequate water infrastructure, such as drinking water networks, water treatment plants and storage facilities. This translates into limited access to safe drinking water and sanitation services. Rapid population growth is also a major challenge. The strong population growth in Cameroon is putting pressure on existing water resources and infrastructure, resulting in an increased demand for water and a pressure on the available supply. Moreover, pollution and water contamination are worrying problems. Industrial activities, agriculture and insufficient waste management practices contribute to water pollution in Cameroon. Contaminated water sources pose risks to the health of the population and further aggravate the water crisis. In addition, climate change is making the situation worse. Cameroon is experiencing the impacts of climate change, such as changes in rainfall patterns, an increased frequency of droughts and floods, as well as an increase in temperatures. These factors affect the availability and quality of water, making it more difficult for everyone to access clean water. To meet the challenge of the water crisis in Cameroon, it is necessary to adopt a comprehensive approach that includes investments in infrastructure, sustainable water management practices, pollution control measures and climate change adaptation strategies. Collaboration between

government agencies, civil society organizations and the private sector is essential to guarantee equitable access to clean water for all Cameroonians.

Indeed, many political, social, economic and environmental factors hinder the proper management of the latter. These factors relate essentially to the immobility of the actors in charge of water issues, the overlap of competencies, the lack of financial resources, the sectoral approach to solving water-related issues, the unilateral "top-down" policy, the inefficiency of the main concessionaire of drinking water distribution, the socio-political context marked by pseudo-stability, the lack of human capacities, the absence of appropriate texts and adequate structures. The consequences are dramatic and significantly affect the development process. Thus, the inevitable scarcity of water, its constant degradation in quality and its unequal distribution are all palpable signs that indicate poor water management and contribute significantly to the impoverishment of populations in terms of health, urbanization, economy and exchange.

Beyond its previously mentioned bills, other elements can contribute to the water crisis in Cameroon. We have deforestation, it leads to a decrease in the ability of soils to retain water and regulate stream flows. This can lead to an increase in soil erosion and a decrease in water quality, which aggravates the water crisis. Water-related conflicts are also an important factor. In some regions of Cameroon, tensions related to access and use of water can lead to conflicts between different communities. These conflicts can disrupt the sustainable management of water resources and aggravate the water crisis. Unsustainable agricultural practices are also a source of pressure on water resources. Intensive agriculture, excessive use of pesticides and chemical fertilizers, as well as the practice of unsustainable irrigation can lead to water pollution and a decrease in the availability of water resources for other uses. Finally, the challenges related to water governance are crucial. Inefficient governance of water resources can lead to poor infrastructure management, a lack of transparency in the distribution of water and conflicts of interest. Strong and participatory governance is essential to guarantee equitable access to water for all. By taking these additional factors into account, it is possible to better understand the complexity of the water crisis in Cameroon and to identify adapted solutions to improve the management and availability of water resources in the country.

3. Conceptual framework for analyzing the water crisis

To analyze the water crisis in Cameroon, a conceptual framework can be developed to understand the various factors contributing to the problem and identify potential solutions. However, we have a proposal for a framework for analyzing the water crisis, namely:

❖ The physical factors of the water crisis in Cameroon include several elements that affect the availability and quality of water in the country. Rainfall and the rainy season are key factors, with seasonal variations that directly affect the availability of water. The topography of Cameroon influences the distribution of water resources, with mountainous regions generally having more water than more arid areas. Climate and climate change can have a significant impact on water resources, changing rainfall patterns and causing extreme weather events. Deforestation and ecosystem degradation affect the water cycle by reducing the ability of soils to retain water. Finally, watershed management is essential to ensure sustainable management of water resources, taking into account agricultural, forestry and urban practices that can influence the quality of water in these watersheds. By understanding these physical factors, it is possible to design strategies and adapted interventions to improve water management in Cameroon.

❖The human factors of the water crisis in Cameroon also play a crucial role in the availability and quality of water in the country. Rapid population growth and urbanization are leading to an increasing demand for water, putting additional pressure on available water resources. Unsustainable agricultural practices, such as the excessive use of pesticides and fertilizers, can contaminate water sources and reduce their quality. In addition, industrial and domestic pollution contributes to the degradation of water quality, making some sources unusable for human consumption. The inadequate management of solid and liquid waste can also lead to contamination of water sources, increasing the risks to public health. Finally, conflicts related to access and management of water resources can aggravate the water crisis in Cameroon, by compromising cooperation between the various stakeholders. Taking into account these human factors, it is essential to implement sustainable policies and practices to ensure effective and equitable water management in Cameroon.

❖ Infrastructure and technology play a crucial role in water management in Cameroon. Water treatment infrastructures, such as wastewater treatment plants and distribution systems, are essential to guarantee access to quality drinking water. However, many regions of the country

suffer from a lack of adequate infrastructure, which limits access to drinking water for many people. Moreover, the use of innovative technologies can contribute to improving water management in Cameroon. For example, the use of real-time monitoring systems can help detect leaks in distribution networks and prevent waste. Likewise, the introduction of more efficient irrigation techniques can allow a more sustainable use of water for agriculture. It is therefore crucial to invest in the development of infrastructure and water-related technologies to meet the challenges of the water crisis in Cameroon. By combining innovative approaches with long-term strategic planning, the country can improve the availability and quality of water for its population, while ensuring sustainable management of water resources.

❖ Governance and politics also play an essential role in water management in Cameroon. Good governance involves effective coordination between the various stakeholders, including local authorities, civil society organizations and the private sector. It is important that water policies and regulations are clear, consistent and applied transparently to ensure effective management of water resources. Moreover, it is crucial that political decision-makers recognize the importance of water as a vital resource and that they prioritize its sustainable management. This involves investing in adequate infrastructure, promoting sustainable agricultural practices and raising public awareness of the importance of water conservation. In addition, an integrated approach to water management, which takes into account social, economic and environmental aspects, is necessary to ensure equitable access to water for all Cameroonian citizens. Finally, regional and international cooperation can also play a key role in water management in Cameroon. By collaborating with its neighbors and benefiting from the support of international partners, Cameroon can strengthen its capacity to effectively manage its water resources and face the challenges posed by climate change and population growth. A collaborative and concerted approach is essential to guarantee sustainable access to water for future generations in Cameroon.

❖ Socio-economic factors play a crucial role in water management in Cameroon. The unequal distribution of water resources between urban and rural areas, as well as socio-economic disparities between the different regions of the country, can lead to tensions and conflicts related to access to water. The most vulnerable populations, such as rural communities and disadvantaged populations, are often the most affected by water shortages and water quality problems. Moreover, Cameroon's economic development, particularly in the agriculture, industry and tourism sectors, is exerting increasing pressure on the country's water resources. The demand for water for agricultural

irrigation, industrial production and human consumption continues to increase, which endangers the future availability of this vital resource. It is therefore essential to put in place policies and measures that promote sustainable water use and that take into account the socio-economic needs of the various stakeholders. Finally, the effects of climate change, such as more frequent droughts and irregular rainfall, have a significant impact on the availability and quality of water in Cameroon. These climate changes exacerbate the already existing challenges related to water management and require effective adaptation and mitigation strategies to guarantee sustainable access to water for all. Socio-economic factors must therefore be taken into account in the implementation of policies and programs aimed at ensuring effective management of water resources in Cameroon.

❖ The environmental impacts of water management in Cameroon are also important. Deforestation, the pollution of rivers and groundwater, as well as the loss of biodiversity due to the overexploitation of water resources, are all harmful consequences of the pressure exerted on aquatic ecosystems. The degradation of water quality resulting from human activities, such as intensive agriculture, mining and the dumping of industrial waste, has repercussions on the health of aquatic ecosystems and on the availability of clean and healthy water for human consumption. In addition, climate change is having a direct impact on Cameroon's water resources, with more frequent droughts and irregular rainfall disrupting the water balance of aquatic ecosystems. These extreme climatic phenomena lead to a decrease in water availability, an increase in the risk of flooding and an alteration of natural habitats, endangering the biodiversity and sustainability of aquatic ecosystems. In addition, the construction of hydraulic infrastructures such as dams and irrigation canals can have adverse consequences on aquatic ecosystems by modifying the natural hydrological regime, disrupting aquatic habitats and blocking the migration of aquatic species. It is therefore essential to take into account the environmental impacts of water management in the planning and implementation of hydraulic projects in Cameroon, in order to preserve biodiversity and the health of aquatic ecosystems for future generations.

❖ The commitment and participation of local communities are essential to ensure sustainable water management in Cameroon. By involving the riparian populations in decision-making regarding water resources, it is possible to guarantee a more equitable and environmentally friendly management. The traditional and local knowledge of communities can also be valuable for the preservation of aquatic ecosystems and the implementation of sustainable practices.

Awareness-raising and environmental education initiatives aimed at informing people about the importance of preserving water and aquatic ecosystems are also crucial. By encouraging responsible behavior, waste reduction and the promotion of sustainable agricultural practices, it is possible to limit the negative impacts on water resources and promote a more efficient and respectful use of water. Finally, collaboration between local authorities, civil society organizations, private companies and local communities is essential to develop inclusive water management policies and strategies adapted to local needs. By promoting dialogue and consultation between the various actors, it is possible to find sustainable solutions that take into account the interests of all and that contribute to the preservation of aquatic ecosystems for future generation.

In conclusion, the water crisis in Africa, in particular in Cameroon, is a complex and multifaceted issue that poses significant challenges for sustainable development, public health and environmental conservation. The theoretical framework described in this chapter provides a basis for understanding the different dimensions of the water crisis, including its definition, the contributing factors and the conceptual framework for analysis. By examining the challenges encountered in ensuring access to clean and safe water, effectively managing water resources and promoting sustainable water use practices, it becomes clear that solving the water crisis requires a holistic and integrated approach. This includes engaging local communities, raising awareness of the importance of water conservation and promoting collaboration among stakeholders to develop inclusive and effective water management strategies. To move forward, it is essential to continue exploring innovative solutions, taking advantage of traditional knowledge and modern technologies, and promoting political reforms that prioritize water security and sustainability. By working together towards a common goal of ensuring equitable access to water resources and protecting the environment, we can make significant progress to address the water crisis in Africa and ensure a better future for all.

CHAPTER 2: ANALYSIS OF THE WATER SITUATION IN CAMEROON

Cameroon, officially known as the Republic of Cameroon, is a country located in Central Africa. It is bordered by Nigeria to the west, Chad to the northeast, the Central African Republic to the east and Equatorial Guinea, Gabon and the Republic of Congo to the south. The country also has a coastline along the Gulf of Guinea in the Atlantic Ocean. The capital of Cameroon is Yaoundé, which serves as the political and administrative center of the country. However, the largest city and economic center is Douala, located on the coast. Cameroon is a linguistically diverse country with more than 200 different languages spoken. The official languages are French and English, reflecting the colonial history of the country as a former French and British colony. Cameroon is known for its cultural diversity, with more than 250 ethnic groups living in the country. Each group has its own traditions, customs and languages, contributing to a rich tapestry of cultural heritage. Traditional music, dance, art and cuisine are important aspects of Cameroonian culture. Cameroon has a mixed economy with agriculture, mining, manufacturing and services sectors contributing to its GDP. The country is an important producer of raw materials such as oil, cocoa, coffee and wood. Economic diversification and infrastructure development are key priorities for sustainable growth. Cameroon is known for its rich biodiversity and its fauna. The country is home to a variety of ecosystems, including tropical forests, savannas and mountains. National parks and wildlife reserves protect endangered species such as elephants, gorillas and chimpanzees. Cameroon is a republic with a presidential system of government. The current president is Paul Biya, in power since 1982. Issues of political stability and governance have been areas of concern in recent years. Like many African countries, Cameroon is facing challenges such as poverty, inequality, corruption and infrastructure deficits.

Access to basic services such as health care, education and drinking water remains a priority for development efforts. This will be the subject of our work. Overall, Cameroon is a country with diverse cultures, natural beauty and economic potential. Its strategic location in Central Africa and its natural resources present opportunities for growth and development. However, meeting the social and economic challenges will be crucial to ensure a sustainable future for the Cameroonian people.

The issue of water poses a double challenge, both for the sustainable management of resources and for access to populations. Water management and in particular access to drinking water is considered an essential issue for socio-economic development by the United Nations.

However, in 2019, WHO and UNICEF agreed to establish that 2.2 billion people still did not have access to safe and continuous drinking water. The situation is even more important in the Sahel countries. Cameroon is one of the countries whose situation is the most critical with 34% of the population who do not have access to drinking water. The situation of drinking water supply in Cameroon has deteriorated considerably over the years. The majority of the inhabitants do not have easy access to clean drinking water. The distribution of resources and infrastructure leads to significant inequalities between rural and urban areas. In Cameroon, access to drinking water and sanitation remains a major challenge despite the efforts made by the government and non-governmental organizations. According to the 2020 report of the World Health Organization (WHO), only 64% of the Cameroonian population has access to an improved source of drinking water, while nearly 30% of the population does not have access to basic sanitary facilities. This precarious situation has direct consequences on the health of the populations, with a high rate of water-borne diseases such as diarrhea, mainly among children. Faced with these challenges, the Cameroonian government has put in place policies aimed at improving access to drinking water and sanitation, in particular through programs for the construction of wells and latrines. In addition, NGOs such as WaterAid and Médecins Sans Frontières are actively intervening on the ground to provide sustainable access to drinking water and adequate sanitation facilities to the most vulnerable populations. Despite these efforts, much remains to be done to guarantee universal access to drinking water and sanitation in Cameroon.

Summary During the 1980s, Cameroonians were relatively well supplied with drinking water by the SNEC and SCANWATER. De nowadays the coverage rate has dropped to 30% in the city and 40% in the countryside due to the lack of investment in the sector, hit by the economic crisis. At the same time, the rate of urbanization has continued to increase, with the corollary of urban sprawl especially in Douala and Yaoundé. In addition, we switched from the regime of free access to water to that of the privatization of public water fountains in 1993, forcing poor households to abruptly integrate the cost of water into their expenditure item. The institutional reform which lasted 10 years and which ended with the creation of the COE and the CAMWATER did not quickly produce the expected results. Thus, population growth will require an increase in the volume of drinking water that the state is struggling to provide for lack of its own financial resources. From then on, the CRC will proceed to rationing, forcing the populations to develop strategies for their water supply. These initiatives could be supported by decentralized local and regional authorities. Cameroon has a dense network of perennial rivers. The main rivers in the

south of the country are the Ntem, the Nyong, the Sanaga and the Wouri, which flow southwest or west into the Gulf of Guinea. The Dja and the Kadéï flow southeast into the Congo River.

1. Data on access to drinking water and sanitation in Cameroon

National statistics indicate "that in 1998, access to drinking water has significantly improved. Indeed, in urban areas, the access rate to drinking water has increased from 73.6% in 1996 to 86.2% in 2001. This optimistic note, however, hides various realities; this the case of the city of Yaoundé, the political capital of the country (1.5 million inhabitants) which has only 56,000 private subscribers to the water system distributed by network by the National Water Company of Cameroon (SNEC). The rest of the city's population resorts either to paid water fountains, or even to wells or springs. The data of Table n ° 1 which presents the number of Cameroonians who have running water in their homes in 1998, reflects the real situation of urban and rural households to access good quality water. In reality, the percentage of households with a tap in their property is only 7.7%, while those who get water from taps (at the neighbor's house or at the public water fountain, whether paid or not) represent 29.1% of the population. Currently, the National Water Company of Cameroon (SNEC) still maintains the monopoly on the sale of water distributed by network in urban areas.

In general, municipalities are heavily indebted to public service providers: in May 1995, their debts to the National Electricity Company, the National Water Company and the National Post and Telecommunications Company amounted to 24 billion FCFA, about six times the annual budget of the Yaoundé Urban Community [Barthélemy Kom Tchuenté, 1995]. At the same time, it is estimated that the area of cities is increasing at a rate of 3% per year. This growth poses a challenge to the authorities who currently do not have an operational mechanism to anticipate and even less control this urbanization. It is the peri-urban areas of large agglomerations as well as small towns that suffer the most from the consequences of this lack of control over urban growth and the resulting lack of equipment. The difficulty lies in the fact that the service providers initially believe that their investments cannot be returned in these areas. The privatization of water services raises another problem, because only large cities are interested in private companies that can provide drinking water service.

In summary, according to information from the Joint Monitoring Program for Water Supply, Sanitation and Hygiene (JMP) of the World Health Organization (WHO) and UNICEF,

access to improved sources of drinking water in Cameroon has improved over time. In 2017, about 77% of the population had access to at least basic drinking water services. However, access to safely managed drinking water services was more limited, with only 21% of the population benefiting from this level of service. With regard to sanitation, the data indicate that access to improved sanitation facilities in Cameroon is restricted. In 2017, only 22% of the population had access to basic sanitation services, while only 5% had access to safely managed sanitation services. These figures highlight the challenges facing Cameroon to guarantee adequate access to drinking water and sanitation for its population. The disparities in access between urban and rural areas, as well as the quality of water sources and sanitation facilities, remain major problems that must be solved to improve public health and well-being in the country.

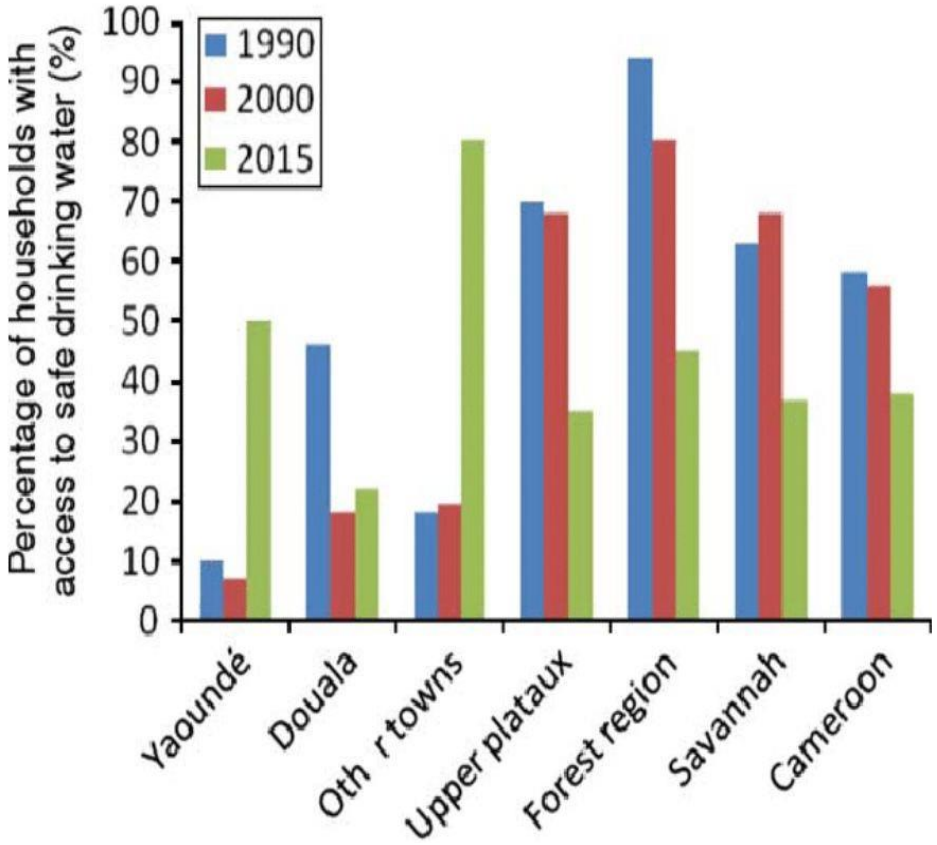

Fig 1: Percentage of households with access to safe drinking water

- **The evolution of the organization of the water service within municipalities**

The organization of water services within municipalities in Cameroon has evolved over the years, reflecting changes in governance structures, policies and regulations. We note a general overview of the evolution of the organization of water services within municipalities in Cameroon:

* Traditional water management: Historically, water services in many municipalities in Cameroon were managed informally or through traditional systems. Local communities often depended on natural water sources such as rivers, streams and wells for their water needs. Traditional practices and community management systems were common in rural areas.

* Centralized water supply systems: With urbanization and population growth, there has been an evolution towards centralized water supply systems managed by municipal authorities or public utilities. The government has played an important role in the development of water supply and sanitation infrastructure in urban areas. Water distribution companies have been created to manage and operate water supply systems.

* Decentralization and local governance: In recent years, there has been a trend towards decentralization and local governance in Cameroon. Municipalities have been given more autonomy and responsibility for the management of water services in their jurisdictions. This change has led to the creation of municipal water services or public services responsible for the planning, implementation and monitoring of water supply and sanitation projects.

* Public-Private Partnerships (PPP): To improve efficiency and service delivery, some municipalities in Cameroon have engaged in public-private partnerships for the management of water services. Private companies or organizations can be hired to operate and maintain water supply systems, under the supervision of municipal authorities.

* Community participation and stakeholder engagement: There is growing recognition of the importance of community participation and stakeholder engagement in the management of water services. Municipalities involve local communities, civil society organizations and other stakeholders in decision-making processes, project planning and monitoring of water supply and sanitation services.

* Regulatory framework and capacity building: The Government of Cameroon is working to strengthen the regulatory framework for water services in order to ensure quality, affordability and

sustainability. Capacity-building initiatives are being implemented to improve the technical and management skills of municipal water services and public utilities.

2. Main water-related challenges and problems in the country

The lack of drinking water led to 256 hospitalization cases and 14 deaths in health facilities in 2020, with children under 5 years old representing 65.23% of hospitalizations. The absence of protected wastewater disposal systems is also a major challenge. Since 1992, the issue of water management, in particular access to drinking water, has been considered crucial for socio-economic development by the United Nations. However, in 2019, WHO and UNICEF highlighted that 2.2 billion people still did not have access to a safe and reliable source of drinking water on an ongoing basis. Cameroon is one of the countries facing a critical situation, with 34% of its population deprived of access to drinking water. In 2010, a study by the Global Water Partnership (GWP) revealed that Cameroon used only 4.14% of its available water resources despite abundant reserves. Despite these data, the majority of the country's inhabitants find it difficult to access clean water for consumption due to inequalities between rural and urban areas. In rural areas, only 43.5% of the inhabitants have access to drinking water, forcing the majority to travel sometimes long and dangerous distances to get water. The available water sources are often untreated, increasing the risk of waterborne diseases such as malaria. Poorly maintained road infrastructure makes access to water points difficult, exacerbating water-related health problems. Consultations in rural health clinics reveal that most of the diseases are water-related. In 2019, the mortality rate attributable to poor water quality, sanitation problems and lack of hygiene was estimated at 45.2 deaths per 100,000 inhabitants. The difficulties of access to drinking water vary according to geographical areas, with particular challenges in peri-urban areas and small agglomerations. The anarchic management of housing, low household incomes, the lack of promotion of rural hydraulic methods by the authorities and the high demand for spring water contribute to the persistent problems. The lack of technical data on the quality of the water consumed, the diversity of the actors involved and the lack of coordination on the ground hinder efforts to effectively meet the population's water needs.

* The anarchic development of housing: The annual growth rate of the population of the cities of Cameroon is high (more than 4% per year) and the spatial growth rate of the order of 3.5%. With this growth, the proportion of houses built per year with land title does not exceed 10% (DEMO, 1987). To this should be added the inability of the public authorities to control the settlements of

households. We are then in a situation where houses are built without a service road, each occupying a plot as he sees fit. In many cases, the main facade of one is the rear facade of the other and the result is: the proximity of wells and latrines, the difficulty of evacuating waste water, the difficulty of passing water pipes and other urban technical networks when planning to do it. The absence of a coherent management of the land makes it difficult to envisage the implantation of works for collective use in areas where spontaneous habitat develops. The peri-urban areas are precisely one of those sectors where spontaneous habitat develops in pockets.

* Low household incomes: The low incomes of people in peri-urban areas and small urban centers (about 25,000 to 40,000 CFA francs / month / households of 5 to 8 people) makes access to water supply networks difficult, the connection rate which is 150,000 CFA francs on average being prohibitive. This is so that even where there is a water network there is a flowering of wells, springs and paid fountain station. In addition, the populations unable to pay excessively high-water bills are forced to modulate the use of the water served by the concessionaires of the network: it is used only for drinking and cooking, and for other uses we get our supplies from wells and springs. When running water is not accessible, it is replaced by water from streams, rivers or springs.

* The lack of technical data to conclude on the quality of the water sources and wells: To persuade the public authorities that it is appropriate to adopt a more positive attitude regarding the support of the populations in the development of wells and sources that deserve to be on the one hand, and on the other hand to get the populations to abandon or to redevelop the structures whose waters are highly polluted, it is necessary to have data on the bacteriological and physico-chemical quality of the water distributed in these structures.

* Difficulties of management of the paying water fountains (BFP): To help the populations to face the problems of drinking water due to the definitive closure of the free water fountains, the municipalities, with the collaboration of certain national and international organizations, have undertaken to distribute drinking water in urban centers by "community paying water fountains". The main initial objective was to rehabilitate the fountains formerly managed by the municipality, to entrust the management to well-organized associations or individuals. According to the provisions of the operating contract of the BFP, the 10 liters of water cost 5 CFA francs. After all the expenses have been paid (consumption costs, the fontainier's salary, maintenance, etc.), it is planned that the profits from the sale of water will be used to finance other development projects of community interest.

In other words, Cameroon is facing several challenges and problems related to water that have an impact on the population and the environment of the country. Some of the main problems include access to clean water. A significant part of the Cameroonian population does not have access to clean and safe drinking water. Rural areas, in particular, face difficulties in accessing drinking water sources, which leads to water-borne diseases and health problems. Water quality is another major concern in Cameroon. Pollution due to industrial activities, agriculture and urban runoff contaminates water sources in Cameroon. This pollution affects both surface water bodies and groundwater, causing health risks for those who depend on these water sources for drinking water and sanitation. The shortage of water is an important problem in certain regions of Cameroon, especially during the dry seasons. Climate change, deforestation and inefficient water management practices contribute to the problems of water scarcity in the country. Access to adequate sanitation facilities is limited in many regions of Cameroon, which leads to poor hygiene practices and contamination of water sources. The lack of adequate sanitation infrastructure contributes to the spread of diseases such as cholera and typhoid. Cameroon is facing challenges in maintaining and expanding water infrastructure to meet the growing demand for water services. Aging infrastructure, inadequate maintenance and insufficient investments in the sector hinder access to reliable water supply and sanitation services. Effective water management practices are essential for the sustainable use of water resources in Cameroon. However, problems such as overexploitation of groundwater, unsustainable agricultural practices and inadequate water governance contribute to the challenges of water management in the country. Cameroon is vulnerable to the impacts of climate change, including changes in rainfall patterns, the increased frequency of droughts and floods and rising temperatures. These climate-related factors affect the availability, quality and distribution of water in the country. Cameroon is vulnerable to the impacts of climate change, including changes in rainfall patterns, the increased frequency of droughts and floods and rising temperatures. These climate-related factors affect the availability, quality and distribution of water in the country.

Addressing these water-related challenges requires a multifaceted approach that includes improving infrastructure, improving water governance, promoting sustainable water management practices, improving access to drinking water and sanitation services and strengthening resilience to the impacts of climate change. International cooperation, investments in water infrastructure, community engagement and sustainable development strategies are key elements to meet these challenges and ensure a more secure water future for Cameroon.

3. Government policies and initiatives to manage the water crisis.

In Cameroon, various actors play a role in the management of water resources, the provision of water-related services and the resolution of water-related problems. These actors include government institutions, non-governmental organizations (NGOs), international organizations, the private sector and local communities. Here is a general overview of some key water actors in Cameroon:

- **Gouvernent Institutions :**

- Ministry of Water and Energy: Responsible for the formulation of policies, regulations and strategies related to the management of water resources and energy in Cameroon.

- Ministry of the Environment, Nature Protection and Sustainable Development: Plays a role in environmental protection and sustainable development, including water-related issues.

- Water Resources Management Authority (CAMWATER): Responsible for the management of water resources, the regulation of water uses and the supervision of water supply and sanitation services.

- Water supply Companies: These are public or private entities responsible for providing water supply services in different regions of Cameroon.

- **Non-Gouvernemental Organizations (NGOs):**

- Several NGOs in Cameroon are working on water-related issues, including improving access to drinking water, promoting sanitation and hygiene practices and raising awareness of water conservation.

- Let us cite for example WaterAid Cameroon, the Cameroonian Association for the Defense of the Environment (ACDE) and the Cameroonian Coalition for Water (CCE).

- **International Organizations :**

- United Nations agencies such as UNICEF and the World Health Organization (WHO) support water and sanitation projects in Cameroon.

- The World Bank, the African Development Bank and other international financial institutions provide financing and technical assistance for water infrastructure projects in Cameroon.

❖ **Private Sector:**

- Private companies play a role in the provision of water supply services, especially in urban areas where public services may not reach.

- The involvement of the private sector in hydraulic infrastructure projects, water treatment technologies and water management solutions are increasing in Cameroon.

❖ **Research institutions :**

- Universities, research centers and academic institutions in Cameroon conduct research on water resources management, water quality monitoring, climate change impacts on water and sustainable water use practices.

❖ **Locals Communities :**

- Local communities are important stakeholders in water management and conservation efforts. Community organizations, water user associations and traditional authorities play a role in the management of local water resources and the promotion of sustainable practices.

Overall, collaboration and coordination between these different actors are essential to meet the challenges related to water in Cameroon, ensure access to drinking water and sanitation services for all and promote sustainable water management practices for the future.

Faced with the current situation regarding water management and the consequences that result from it, the Government of Cameroon as well as many international organizations, donors and NGOs have mobilized to improve access to drinking water. Since 2005, Cameroon has aligned itself with the objectives of the United Nations and committed to setting up a national integrated water resources management plan. This plan aims to improve the management of water resources while preserving the environment and ensuring their sustainability. Since then, the government has been adapting its strategies to achieve these objectives. However, despite these efforts, the country continues to face an increasingly serious water crisis. Since 2004, water management in Cameroon has been decentralized, with municipalities responsible for setting up the necessary

infrastructure to distribute water to their inhabitants. However, public services face difficulties such as lack of financial resources, which prevents achieving the set goals. This is why international organizations such as the UN and the World Bank, as well as states such as France and NGOs, have mobilized to finance and implement programs aimed at improving access to drinking water. Aware of the dangers that this situation entails, the NGO Travaux Publics Sans Frontières (TPSF) has decided to set up a program in Cameroon in order to carry out several projects throughout the country, aimed at significantly improving the living conditions of the populations. The Cameroonian government has also implemented various policies and initiatives to deal with the water crisis and improve its management. Some of these policies and initiatives include:

➢ National Water Policy: The Government of Cameroon adopted a National Water Policy in 1996, which aims to ensure sustainable management of water resources, improve access to drinking water and promote integrated management of water resources.

➢ Water Code: In 2001, Cameroon promulgated a Water Code that provides a legal framework for the management, protection and sustainable use of water resources in the country. The Water Code also includes provisions relating to water rights, water quality standards and water allocation mechanisms

➢ National Water Resources Management Plan: The Government has developed a National Water Resources Management Plan to guide the sustainable development and management of water resources in Cameroon. The plan includes strategies for water conservation, watershed protection and water infrastructure improvement.

➢ Rural Water Supply program: The government has implemented a Rural Water Supply Program to improve access to drinking water in rural areas. The program includes the construction of water supply systems, the drilling of boreholes and the promotion of community-based approaches to water management.

➢ National Sanitation Strategy: Cameroon has developed a National Sanitation Strategy to meet the challenges of sanitation and promote hygiene practices. The strategy focuses on improving sanitation infrastructure, promoting behavior change and improving access to sanitation facilities.

➢ Public-private partnerships: The government has encouraged public-private partnerships in the water sector to improve service delivery, attract investment and promote innovation in water management. The participation of the private sector is increasingly considered as a key strategy to expand access to water services.

➢ Adaptation to climate change: Given the impact of climate change on water resources, the government has taken measures to adapt to changing climatic conditions, in particular by promoting water conservation practices, implementing drought-resistant agricultural techniques and integrating climate change considerations into water management plans.

These policies and initiatives demonstrate the government's commitment to address the water crisis in Cameroon and to ensure sustainable access to drinking water for all citizens. Collaboration with stakeholders, effective policy implementation and continuous investments in water infrastructure are essential to achieve these goals. But in the face of all its objectives, have the objectives set by the government and NGOs been achieved in the water crisis in Cameroon?

The results of the objectives set by the government and NGOs in terms of managing the water crisis in Cameroon vary depending on the regions and the initiatives put in place. On some key points to take into consideration: Access to drinking water, the government and NGOs have implemented programs to improve access to drinking water in rural and urban areas. Progress has been made, but challenges persist due to the lack of adequate infrastructure, water pollution and financial constraints. Sanitation, efforts have been made to improve access to adequate sanitation facilities, including toilets and sanitation systems. However, many communities continue to face sanitation challenges, which has an impact on public health. Water resources management, sustainable water resources management initiatives have been put in place to ensure the long-term availability of water. This includes water conservation, the protection of water sources and raising awareness of the importance of responsible water management. It is important to note that progress has been made in some areas, but there is still much to be done to guarantee universal access to drinking water and sanitation in Cameroon. Continuous collaboration between the government, NGOs, the private sector and civil society is essential to meet these challenges and achieve the objectives set in terms of water management.

In conclusion, the water situation in Cameroon is complex and multifaceted, with a mixture of progress and challenges. On the one hand, there have been significant improvements in access to

drinking water and sanitation facilities, thanks to government initiatives, international partnerships and the work of NGOs. Efforts such as the National Water Supply and Sanitation Program and the creation of the Water Sector Development Strategy have contributed to increasing access to safe water sources and improving hygiene practices in many communities. However, despite this progress, significant challenges remain. The lack of adequate infrastructure, especially in rural areas, continues to hinder access to drinking water for many Cameroonians. Water pollution due to industrial activities, agricultural runoff and inadequate waste management practices further aggravate the problem, posing serious risks to the health of the population. In addition, the financial constraints faced by the government and individuals limit the resources available for the development and maintenance of water infrastructure. Moving forward, addressing these challenges will require a multifaceted approach that involves collaboration between government agencies, NGOs, community-based organizations and international partners. Investments in infrastructure development, water treatment facilities and pollution control measures are essential to guarantee sustainable access to drinking water for all Cameroonians. In addition, efforts to raise awareness of the importance of water conservation and hygiene practices must be continued to promote behavioral change at individual and community levels. In conclusion, while progress has been made in improving access to drinking water in Cameroon, there is still much to be done to ensure that all citizens have access to safe and reliable sources of water. By working together and prioritizing water management and conservation efforts, Cameroon can get closer to its goal of universal access to drinking water and sanitation for all.

PART II: DIAGNOSIS AND EVALUATION OF THE WATER CRISIS IN CAMEROON

Access to drinking water is a crucial issue in Cameroon, where many regions suffer from a lack of adequate infrastructure to provide clean and safe drinking water to the population. This situation has serious consequences for the health, education and economic development of local communities. In this part, we will explore the challenges related to access to drinking water in Cameroon, as well as the impacts of this problem on the daily life of the inhabitants. The water crisis in Cameroon can be diagnosed and assessed through various factors, including:

Access to drinking water: Many regions of Cameroon suffer from a lack of access to clean and safe drinking water. This situation is mainly due to inadequate infrastructure, lack of water treatment facilities and pollution of water sources. In many communities, residents have to travel long distances to find safe drinking water, which can lead to risks to their health and well-being.

The lack of access to adequate drinking water has serious consequences for the health of local populations, especially children, who are more vulnerable to water-related diseases. Diarrheal diseases, such as cholera and dysentery, are common in regions where water is not treated properly. In addition, the lack of hygiene linked to the absence of drinking water can lead to an increase in infectious and parasitic diseases.

In addition, the lack of access to clean drinking water has a significant economic impact. People who spend a lot of time looking for water have less time to work or study, which limits their opportunities to improve their living conditions. In addition, the costs associated with water-related diseases can be high, both for individuals and for public health systems. It is therefore crucial to invest in adequate water supply infrastructure, water treatment facilities and health education programs to guarantee access to clean and safe drinking water for all the inhabitants of Cameroon. This will not only help improve the health and well-being of local people, but also stimulate the economic and social development of the country as a whole.

Water quality in Cameroon is a major concern due to the contamination of many water sources by pathogens, chemical pollutants and waste. The main sources of water contamination in Cameroon include industrial, agricultural and domestic pollution, as well as the lack of adequate infrastructure to treat and distribute drinking water.

The consequences of poor water quality on the health of Cameroonian populations are serious. The consumption of contaminated water can lead to water diseases such as diarrhea, cholera, typhoid and other gastrointestinal infections. These diseases mainly affect children, the elderly and immunocompromised people, and can lead to death if not treated promptly. In addition, the poor quality of the water has a negative impact on the education of children in Cameroon. Water-related diseases lead to frequent absences from school, which affects children's academic success and jeopardizes their future. In addition, women and girls are often in charge of collecting water in regions where access to drinking water is limited, which reduces their available time for education and other activities. To improve water quality in Cameroon, it is essential to invest in modern water treatment infrastructure, strengthen environmental regulations to limit water pollution and educate the population on good hygiene and water management practices. These measures will help protect the health of Cameroonian populations and promote the sustainable development of the country.

The shortage of water in Cameroon can be attributed to several interrelated factors, lack of adequate infrastructure: Water supply infrastructure, such as distribution networks and water treatment systems, are often insufficient or poorly maintained in many regions of Cameroon. This leads to significant water losses and uneven distribution of drinking water. Deforestation: Deforestation, due to unsustainable logging and land conversion for agriculture and urbanization, leads to a decrease in the ability of soils to retain water and regulate river flows. This can lead to more frequent droughts and a decrease in the availability of water. Climate Change: Cameroon is facing climate change that is reflected in unpredictable variations in rainfall, higher temperatures and extreme weather events such as floods and droughts. These changes affect the availability and quality of water in the country. Rapid population growth: The rapid population growth in Cameroon leads to an increase in the demand for water for domestic, agricultural and industrial needs. This puts additional pressure on the already limited water resources and contributes to the water shortage.

To remedy the water shortage in Cameroon, it is necessary to implement measures such as: investing in efficient and sustainable water supply infrastructure, promoting the sustainable management of water resources by encouraging the reuse of wastewater, the collection of rainwater and the protection of watersheds, raising public awareness of the importance of saving water and preserving water resources, strengthening local capacities in water management and promoting community participation in decision-making, encouraging technological innovation to

improve access to drinking water, in particular by developing solutions based on renewable energies. By implementing these measures in an integrated and collaborative way, Cameroon can progress towards a more sustainable management of its water resources and guarantee equitable access to water for all its population.

- The unequal distribution of water in Cameroon can be attributed to several socio-economic and geographical factors. We note some elements that contribute to this inequality:

- Rapid urbanization: With rapid urbanization and an increasing concentration of the population in urban areas, the demand for water is increasing significantly in these regions. Water supply infrastructures are often not able to meet this growing demand, which creates disparities in access to water between urban and rural areas.

- Concentration of economic activity: Areas where economic activity is more developed, such as industrial areas and tourist areas, tend to benefit from a better water supply infrastructure due to the needs of companies and tourists. This creates gaps in access to water between economically developed regions and less developed regions.

- Inefficient management of water resources: Inefficient management of water resources, including overexploitation of groundwater, water pollution and waste, contributes to an uneven distribution of water. Regions that are poorly managed from an environmental point of view may suffer from water shortages, while other regions may benefit from better management of their water resources.

- Access to drinking water services: Access to drinking water services is often limited in rural and remote areas, where people often depend on unsafe water sources such as wells and rivers. On the other hand, in urban areas, drinking water services are generally more accessible, but can be unevenly distributed depending on the socio-economic status of the inhabitants.

To remedy this unequal distribution of water in Cameroon, it is essential to implement policies and programs that aim to guarantee equitable access to water for the entire population. This could include Investing in water supply infrastructure in rural and peri-urban areas to improve access to drinking water. Promote the integrated management of water resources to ensure sustainable and equitable use of water. Raise public awareness of the importance of preserving water resources and encourage water conservation practices. Strengthen local capacities in water management and promote community participation in decision-making. By adopting a holistic and

participatory approach, Cameroon can progress towards a more equitable distribution of water and guarantee universal access to this vital resource.

The Cameroonian government has taken measures to improve access to water and reduce disparities in the distribution of this vital resource. It has implemented policies and programs aimed at strengthening the supply of drinking water in rural and urban areas, in partnership with international organizations and local actors. Investments have been made in the construction of water supply infrastructure, such as distribution networks, wells, boreholes and water treatment plants. Efforts are also being made to raise public awareness of the importance of preserving water resources and rational use of water. The government works in collaboration with local communities to promote the participatory management of water resources, involving people in the planning, implementation and management of water-related projects. Local capacity-building initiatives are also being put in place to ensure sustainable and equitable long-term water management.

Despite these efforts, challenges persist and require continuous and coordinated action to guarantee equitable access to water for all Cameroonian citizens.

The involvement of stakeholders is essential to guarantee the success of initiatives aimed at improving access to water in Cameroon. The stakeholders involved in water management include government authorities, international organizations, NGOs, private companies, local communities and the citizens themselves. Government authorities play a central role in the development and implementation of water-related policies and programs. They must coordinate the efforts of the various stakeholders, allocate adequate financial resources and ensure effective regulation to guarantee equitable access to water for all. International organizations, such as the UN and the World Bank, provide significant financial and technical support to strengthen national water management capacities and implement drinking water supply projects. NGOs play a crucial role in raising awareness, educating and engaging local communities in the sustainable management of water resources. They can also provide technical assistance for the construction of water supply infrastructures in disadvantaged areas. Private companies can contribute to improving access to water by investing in drinking water supply projects and providing sanitation services to local populations. Local communities are key actors in the participatory management of water resources. Their involvement in the planning, implementation and management of water-related projects is essential to ensure the sustainability and effectiveness of interventions. Finally,

citizens themselves have a role to play by adopting responsible consumption practices, preserving water resources and actively participating in water management initiatives at the local level.

By working together and involving all relevant stakeholders, it is possible to overcome the challenges related to access to water in Cameroon and ensure sustainable and equitable management of this vital resource.

Overall, the water crisis in Cameroon requires a multifaceted approach that addresses issues of access, quality, scarcity, distribution, governance and stakeholder involvement. By diagnosing and evaluating these factors, stakeholders can develop targeted interventions to improve water security and ensure sustainable access to drinking water for all Cameroonians.

CHAPTER 3: SOCIO-ECONOMIC AND ENVIRONMENTALIMPACTS OF THE WATER CRISIS

The water crisis in Cameroon has significant socio-economic and environmental impacts that affect the well-being of its population and the sustainability of its ecosystems. In this chapter, we will explore the different ways in which the water crisis affects the country, from its effects on public health and livelihoods to its implications for the environment and natural resources. For example:

Public Health Impacts: The lack of access to clean and safe drinking water leads to waterborne diseases such as cholera, typhoid and diarrhea, which pose a significant threat to public health. Poor sanitation and hygiene practices further exacerbate the spread of water-related diseases, especially in rural areas and informal settlements. Women and children are particularly vulnerable to the health effects of the water crisis, as they often bear the burden of collecting water from unsafe sources and are at higher risk of waterborne diseases. Economic Impacts: The water crisis has economic implications for households, businesses and the overall economy of Cameroon. Productivity losses due to water-related diseases and time spent collecting water can have a negative impact on household incomes and livelihoods. Companies can face difficulties in maintaining their activities and productivity without reliable access to water for production processes, agriculture or sanitary facilities.

Environmental Impacts: The overexploitation of water resources for agriculture, industry and domestic use can lead to water scarcity, the depletion of aquifers and the degradation of water quality. Deforestation, pollution and climate change are further aggravating the environmental impacts of the water crisis, affecting ecosystems, biodiversity and natural habitats. Droughts, floods and other extreme weather events linked to climate change can disrupt the availability of water and exacerbate water stress in Cameroon.

Social Impacts: The water crisis disproportionately affects marginalized communities, including rural populations, indigenous groups and urban slum dwellers. Limited access to water services can perpetuate social inequalities and disparities, exacerbating poverty, food insecurity and social unrest. Gender disparities in water access and management can further marginalize women and girls, limiting their opportunities for education, employment and empowerment.

By understanding the socio-economic and environmental impacts of the water crisis in Cameroon, stakeholders can develop targeted interventions and policies to address these challenges and work on sustainable solutions to improve access to water, public health, livelihoods and environmental sustainability.

Fig 2: Water scarcity and its social implications

1. Consequences on public health and the living conditions of the population

The consequences of the water crisis on public health and the living conditions of the people in Cameroon are profound and multifaceted. Lack of access to clean and safe drinking water, inadequate sanitation facilities and poor hygiene practices contribute to a range of health problems that affect individuals and communities across the country. Access to safe drinking water is essential for human life and development, but unfortunately, it is a luxury that many people in Africa do not have. According to the United Nations, nearly 663 million people around the world do not have access to safe and clean drinking water, and the majority of these people are in Africa. The lack of access to safe drinking water not only has an impact on health, but also on education and economic growth, making it an urgent problem that requires attention and action.

❖ Waterborne Diseases :

- The most immediate and direct consequence of the water crisis is the prevalence of waterborne diseases such as cholera, typhoid, dysentery and diarrhea. Contaminated water sources harbor pathogens that cause these diseases, leading to symptoms such as vomiting, diarrhea, dehydration and, in severe cases, death.

- Children under the age of five are particularly vulnerable to waterborne diseases, diarrheal diseases being the main cause of mortality in this age group. Lack of access to safe drinking water for drinking, cooking and washing increases the risk of infection and transmission of waterborne pathogens.

❖ **Impact on Maternal and Child Health:**

The divergent social positions of African women and men lead to differences in responsibilities, rights and access to water, so that African women are disproportionately affected by the scarcity of drinking water. In most African societies, women are considered to be the collectors, managers and guardians of water, especially in the domestic sphere which includes household chores, cooking, washing and raising children. Due to these traditional gender work roles, women are forced to spend about sixty percent of each day collecting water, which translates into about 200 million collective working hours by women worldwide per day and a decrease in the time available for education. In addition, due to natural biological differences, when schools do not have the resources to provide appropriate toilets, girls usually drop out before reaching puberty. Water scarcity exacerbates this problem, as indicated by the correlation between the decrease in access to water and a decrease in the combined enrollment of women in primary, secondary and tertiary education. For African women, their daily role in recovering clean water often means carrying the typical jerry can that can weigh more than 40 pounds when full for an average of six kilometers a day. This has health consequences such as permanent skeletal damage due to the transport of heavy loads of water over long distances every day, which translates into physical tension that contributes to an increase in stress, an increase in the time spent on health recovery and a decrease in the ability not only to physically attend educational institutions, but also to mentally absorb education due to the effect of stress on decision-making and memory skills. In addition, in terms of health, access to safe and clean drinking water leads to better protection against diseases and waterborne diseases, which increases the ability of all students to attend school.

- Pregnant women and mothers of young children are facing additional challenges due to the water crisis. Inadequate access to safe drinking water and sanitation increases the risk of maternal infections, pregnancy complications and neonatal health problems.

- In Cameroon, the lack of drinking water and good hygiene practices also has an impact on the health of children, leading to malnutrition, stunting and developmental delays. Children who frequently suffer from waterborne diseases can miss school, suffer from cognitive impairments and face long-term consequences on their health.

Basically, the lack of access to drinking water contributes significantly to poor health in Cameroon. Contaminated water sources can cause waterborne diseases such as cholera, dysentery, typhoid fever and hepatitis A. In many parts of Africa, women and children spend hours every day walking long distances to get water from unsanitary sources, putting them at risk of contracting waterborne diseases. According to the World Health Organization, almost 3.4 million people die every year from water-related diseases, and most of them are in developing countries. Access to safe drinking water is essential to prevent these diseases and promote good health.

- **Hygiène and Sinisation :**

- Inadequate sanitation facilities, including the lack of toilets, hand washing stations and appropriate waste disposal systems, contribute to the spread of infectious diseases in communities. Open defecation and poor hygiene practices contaminate water sources and increase the risk of diarrheal diseases.

- Women and girls are disproportionately affected by the lack of sanitation facilities, as they often find it difficult to access safe and private spaces for menstrual hygiene management. This can lead to health problems, social stigma and barriers to education and economic opportunities.

- **Impact on Live l'Hood :**

- The health impacts of the water crisis also have economic repercussions for households and communities in Cameroon. Productivity losses due to water-related diseases lead to missed working days, a reduction in income and an increase in health expenses.

- Families may be forced to allocate limited resources to the treatment of waterborne diseases instead of investing in education, nutrition or other essential needs. The cycle of poverty perpetuated by the water crisis further hinders socio-economic development and well-being.

Addressing the consequences of the water crisis on public health and living conditions in Cameroon requires a holistic approach that integrates water supply, sanitation, hygiene promotion,

health services and community empowerment initiatives. By investing in sustainable water infrastructure, promoting hygiene education and strengthening health systems, stakeholders can mitigate the health impacts of the water crisis and improve the general well-being of the population.

❖ **Impact on Education**

Access to clean water also has an impact on education, especially for girls. In many regions of Cameroon, girls are in charge of collecting water for their families, and they often miss school to do so. This means that they are falling behind in their studies and that many are dropping out of school altogether. The lack of access to drinking water also has an impact on the hygiene and sanitation of schools. Providing schools with adequate drinking water sources and sanitation facilities can help improve school attendance, reduce dropout rates and promote better academic performance.

In addition, the water crisis in Cameroon exacerbates existing inequalities and vulnerabilities within the population, disproportionately affecting marginalized groups such as rural communities, indigenous populations, women, children and people with disabilities. These groups often face barriers to accessing safe drinking water and sanitation services, which leads to increased health risks and social exclusion.

- Rural communities: Many rural areas of Cameroon do not have access to basic water infrastructure, forcing residents to rely on unsanitary water sources such as rivers, ponds or unprotected wells. Limited access to drinking water and sanitation facilities in rural areas contributes to higher rates of waterborne diseases and malnutrition among rural populations.

- Indigenous populations: Indigenous communities in Cameroon often face discrimination, dispossession of their land and marginalization, which further restricts their access to drinking water and sanitation services. Cultural barriers, linguistic differences and lack of representation in decision-making processes can hinder efforts to solve the water crisis in Indigenous territories.

- Women and Girls: Women and girls bear a disproportionate burden of the water crisis, as they are usually responsible for collecting water, managing household hygiene and caring for sick family members. Inadequate access to safe drinking water and sanitation facilities can exacerbate gender disparities in education, employment and health for women and girls in Cameroon.

- Children: Children are particularly vulnerable to the health effects of the water crisis, as their developing immune systems and limited access to health services increase their vulnerability to waterborne diseases. The lack of drinking water to drink, wash and wash hands poses significant risks to the health and well-being of children, hindering their growth and development.

- People with disabilities: People with disabilities face unique challenges in accessing safe drinking water and sanitation services due to physical barriers, discrimination and lack of inclusive infrastructure. The limited availability of accessible toilets, hand washing stations and hygiene education materials further marginalizes people with disabilities in their efforts to maintain good health and hygiene practices.

Addressing the intersectional impacts of the water crisis on marginalized groups in Cameroon requires targeted interventions that prioritize equity, inclusion and community participation. By engaging with local stakeholders, civil society organizations and marginalized communities themselves, decision-makers and development partners can design more effective and sustainable solutions that meet the specific needs and vulnerabilities of these populations.

2. Effects on the economic and social development of Cameroon

WASHINGTON, August 20, 2019 — The world is facing an invisible water quality crisis that is reducing the potential economic growth of heavily polluted areas by a third and threatening human and environmental well-being: this is the conclusion of a report published by the World Bank under the title Quality Unknown: The Invisible Water Crisis (Unknown Quality: The invisible water crisis).

Using new data and methods, this study demonstrates how the conjunction of bacteria, wastewater and chemicals and plastics can extract oxygen from the water supply and transform water into poison for human beings and ecosystems. In order to shed some light on the issue, the World Bank has set up the world's largest database on water quality based on data collected in the field at monitoring stations, using remote sensing techniques and according to the machine learning process. According to the report, the lack of clean drinking water reduces economic growth by a third. Its authors call for immediate attention to be paid, at the global, national and local level, to these dangers which threaten both developed and developing countries.

"Clean water is an essential factor for economic growth. The deterioration of water quality hinders economic growth, aggravates health problems, reduces food production and exacerbates poverty in many countries," notes David Malpass, President of the World Bank Group. "The public authorities must urgently take measures to combat water pollution so that countries can grow faster in an equitable and environmentally sustainable way. " When biochemical oxygen demand — a measure of the amount of organic pollution in the water and an indirect measure of overall water quality - exceeds a certain threshold, GDP growth in downstream regions suffers a decline of up to a third due to the repercussions on health, agriculture and ecosystems.

Nitrogen is one of the main causes of poor water quality: spread in the form of fertilizers on agricultural land, it ends up in rivers, lakes and oceans where it turns into nitrates. Children exposed to nitrates from an early age suffer from growth and brain development problems that have repercussions on their health and, later, on their ability to earn a living as adults. The runoff and the discharge into the water of each kilogram of additional nitrogen fertilizer per hectare are likely to increase the level of stunting in children by up to 19% and to reduce their income by some 2% in adulthood compared to children not exposed to these products.

The report also notes that agricultural yields are decreasing under the effect of increased salinity of water and soil resulting from more intense droughts, storm surges and increased water extraction. The amount of food that humanity loses every year due to salty waters would feed 170 million people. The report recommends that countries take various measures to improve water quality: environmental policies and standards; accurate assessment of polluting loads; effective regulatory enforcement systems; water treatment infrastructure facilitated by incentives for private investment; reliable and accurate information to households to encourage citizen participation.

The water crisis in Cameroon is having considerable effects on the economic and social development of the country. Limited access to safe drinking water not only has an impact on the health and well-being of the population, but also hinders economic productivity and social progress. Here, we will explore the different ways in which the water crisis in Cameroon affects the economic and social development of the country, highlighting the challenges faced by communities and the urgent need for sustainable solutions to guarantee access to drinking water for all. The water crisis in Cameroon has significant effects on the economic and social development of the country.

*** Economic Impact:**

- Limited access to safe drinking water hinders economic productivity because people, especially women and children, spend a lot of time looking for water at remote sources.

- The lack of access to safe drinking water leads to an increase in health care costs due to water-borne diseases, which can put more strain on the country's already limited health resources.

- Water scarcity can also have an impact on agricultural productivity, as farmers find it difficult to irrigate their crops and provide water to livestock, which leads to a reduction in food production and food insecurity. The water crisis in Cameroon is having significant economic impacts on the country. Limited access to safe drinking water hinders economic productivity and development in several ways:

- Health care costs: Lack of clean drinking water leads to a higher incidence of waterborne diseases such as cholera, typhoid and diarrhea. The result is an increase in health care costs for individuals and the government. The treatment of these diseases consumes a significant part of the health care budget, diverting resources that could be used for other essential services.

- Loss of productivity: Without access to drinking water, communities often spend hours every day collecting water from remote sources. This tedious task disproportionately affects women and children, who are usually in charge of fetching water. As a result, valuable time that could be spent on education, income-generating activities or other productive tasks is lost, which leads to a reduction in economic output.

- Agricultural impacts: Agriculture is a vital sector of the Cameroonian economy, but farmers are facing challenges due to the water crisis. Insufficient access to water for irrigation limits agricultural production and reduces yields. This not only affects food security, but also contributes to the decline in farmers' incomes, perpetuating poverty in rural areas.

- Commercial operations: Many companies in Cameroon depend on water for their operations, such as manufacturing, hospitality and agriculture. Limited access to drinking water can disrupt production processes, increase operational costs and affect the quality of goods and services. This can lead to a decrease in competitiveness in the global market and hinder economic growth.

- Tourism Industry: The natural beauty and diversity of Cameroon's fauna make it an attractive destination for tourists. However, the water crisis can have an impact on the tourism industry by affecting the availability of drinking water for visitors and sanitary facilities in tourist areas. This can deter tourists from visiting the country, resulting in a loss of income for companies and the government.

Overall, the economic impact of the water crisis in Cameroon is significant and multifaceted, affecting various sectors of the economy and hindering global development. Addressing this crisis through sustainable water management practices and infrastructure development is crucial to unlocking the country's economic potential and improving the well-being of its population.

*** Social Impact:** The water crisis in Cameroon has profound social impacts that affect the well-being and livelihoods of individuals and communities across the country. Some of the main social impacts of the water crisis in Cameroon include:

- The water crisis disproportionately affects vulnerable populations, such as women and children, who are often in charge of fetching water. This can limit their access to education and economic opportunities.

- The lack of access to drinking water can lead to poor sanitation and hygiene practices, increasing the risk of waterborne diseases and having an impact on public health in general.

- Water scarcity can also exacerbate conflicts over water resources, leading to social unrest and displacement of communities.

- Health and Sanitation: Limited access to drinking water leads to poor sanitation practices, resulting in a higher prevalence of waterborne diseases such as cholera, typhoid and diarrhea. These diseases disproportionately affect vulnerable populations, including children, pregnant women and the elderly, resulting in high mortality rates and increased health care costs. The lack of adequate sanitary facilities also contributes to the spread of diseases and affects public health in general.

- Education: The water crisis in Cameroon has a direct impact on education, especially for children, especially girls. Children, especially girls, often have the burden of fetching water from distant sources, which can take up a lot of time and energy that could be spent on going to school. The

lack of access to clean water and sanitation facilities in schools can lead to absenteeism, poor academic performance and dropout rates, perpetuating the cycle of poverty and limiting opportunities for future generations.

- Gender equality: Women and girls are disproportionately affected by the water crisis in Cameroon, as they are often responsible for water collection and household chores. The time spent fetching water from remote sources limits their opportunities for education, income-generating activities and personal development. Inadequate access to safe drinking water also exposes women and girls to gender-based violence and exploitation when they travel long distances to get water.

- Livelihoods and economic opportunities: The water crisis in Cameroon hinders economic opportunities for individuals and communities, especially in rural areas where agriculture is the main source of livelihood. Limited access to drinking water for irrigation purposes reduces crop yields, affects food security and limits income-generating activities for farmers. In addition, the time spent collecting water can hinder participation in other income-generating activities, perpetuating poverty and inequality.

- Social cohesion and community development: Access to drinking water is essential to promote social cohesion and community development. Communities without reliable access to safe drinking water can face conflicts over scarce resources, such as water sources, leading to tensions and social unrest. The lack of access to drinking water also hinders community development initiatives and limits the possibilities of social gatherings and cultural activities that promote unity and well-being.

burden of fetching water from distant sources, which can take up a lot of time and energy that could be spent on going to school. The lack of access to clean water and sanitation facilities in schools can lead to absenteeism, poor academic performance and dropout rates, perpetuating the cycle of poverty and limiting opportunities for future generations.

- Gender equality: Women and girls are disproportionately affected by the water crisis in Cameroon, as they are often responsible for water collection and household chores. The time spent fetching water from remote sources limits their opportunities for education, income-generating activities and personal development. Inadequate access to safe drinking water also exposes women and girls to gender-based violence and exploitation when they travel long distances to get water.

- Livelihoods and economic opportunities: The water crisis in Cameroon hinders economic opportunities for individuals and communities, especially in rural areas where agriculture is the main source of livelihood. Limited access to drinking water for irrigation purposes reduces crop yields, affects food security and limits income-generating activities for farmers. In addition, the time spent collecting water can hinder participation in other income-generating activities, perpetuating poverty and inequality.

- Social cohesion and community development: Access to drinking water is essential to promote social cohesion and community development. Communities without reliable access to safe drinking water can face conflicts over scarce resources, such as water sources, leading to tensions and social unrest. The lack of access to drinking water also hinders community development initiatives and limits the possibilities of social gatherings and cultural activities that promote unity and well-being.

Overall, the social impacts of the water crisis in Cameroon are considerable and affect various aspects of daily life, health, education, gender equality, livelihoods and community development. Addressing these social impacts requires global strategies that prioritize equitable access to drinking water, sanitation facilities and hygiene practices to improve the well-being and quality of life of all Cameroonians.

Access to safe drinking water is essential for economic growth. In many regions of Africa, agriculture is the backbone of the economy, and it depends heavily on water. However, scarcity and contamination of water can lead to poor harvests, which can have devastating effects on communities that depend on agriculture. Lack of access to safe drinking water can lead to increased health care costs, reduced productivity and loss of income due to illness. Access to safe drinking water can help stimulate economic growth, reduce poverty and promote sustainable development. In addition to the social impacts mentioned above, it is important to highlight the interconnection between the water crisis and other urgent problems in Cameroon, such as climate change, urbanization and conflicts. Climate change is exacerbating water scarcity and extreme weather events, leading to more frequent droughts and floods that are putting more strain on the country's water resources. Urbanization and population growth are also contributing to the increase in water demand, putting pressure on existing infrastructure and exacerbating the water crisis. In addition, in regions of Cameroon affected by conflicts, access to drinking water is often compromised due to damaged infrastructure, population displacement and insecurity. The lack of

access to safe drinking water in conflict zones not only exacerbates the humanitarian crisis, but also hinders peace-building and sustainable development efforts in these areas. Addressing the social impacts of the water crisis in Cameroon requires a multisectoral approach that integrates water management with climate adaptation, urban planning, conflict resolution and community engagement. Investing in sustainable water infrastructure, promoting water conservation practices, empowering women and marginalized groups and fostering partnerships between the government, civil society and the private sector are essential steps to achieve water security and improve the social well-being of all Cameroonians.

3. Impact on the environment and naturals resources

The water crisis in Cameroon not only has important social implications, but also has a profound impact on the environment and the country's natural resources. Depletion and contamination of water sources, deforestation, loss of biodiversity and pollution are some of the main environmental consequences of the water crisis in Cameroon. These environmental impacts not only affect the ecosystem, but also have profound implications for public health, food security and sustainable development in the country. Addressing the environmental aspects of the water crisis is crucial to ensure the long-term well-being of the population and the natural environment in Cameroon. The water crisis in Cameroon has a series of environmental impacts that are interconnected and exacerbate the global degradation of the country's natural resources. Some of the key impacts include:

- ➢ Depletion of water sources: overexploitation of water for domestic, agricultural and industrial purposes has led to the depletion of groundwater reserves and surface water sources. This not only affects the natural water for human consumption, but al so disrupts the natural water cycle, leading to reduced river flow, degradation of wetlands and loss of aquatic habitats.
- ➢ Contamination of water source. Pollution from agricultural harvest, industrial discharges and inadequate sanitation practices has contaminated many water sources in Cameroon. This pollution not only affects the quality of drinking water, but also poses a threat to aquatic ecosystems. And biodiversity chemical pollutants, heavy metals and pathogens can have long-lasting effects on the environment and public health.
- ➢ Deforestation and land degradation. The water crisis in Cameroon is loosely linked to deforestation and land degradation, as sustainable land use practices contribute to soil erosion, sedimentation of water bodies and loss of forest cover. Deforestation reduces the ability of

ecosystems to regulate water flow, leading to increased risks of flooding, soil erosion and loss of biodiversity.

- ➢ Pearl of biodiversity: the degradation of water sources and habitats due to the water crisis has a significant impact on biodiversity in Cameroon. Aquatic species, including fish, amphibians and plants aquatic, are particularly vulnerable to changes in water quality and quantity. Biodiversity loss can disrupt ecosystem functions, reduce resilience to environmental stressors, and threaten overall ecosystem health
- ➢ Impacts of climate change: Cameroon's water crisis is exacerbated by climate change, which is

Addressing the environmental impacts of the water crisis in Cameroon requires integrated and sustainable approaches that prioritize the conservation, restoration and effective management of water resources. Promoting sustainable land use practices, implementing watershed management strategies, investing in water infrastructure and raising awareness of the importance of preserving natural ecosystems are essential steps to mitigate the environmental consequences of the water crisis in Cameroon.

In addition, the fight against the environmental impacts of the water crisis in Cameroon requires a multi-stakeholder approach that involves collaboration between government agencies, non-governmental organizations, local communities and the private sector. The implementation of policies and regulations aimed at controlling pollution, promoting sustainable water use practices and protecting critical ecosystems is essential to preserve water resources and mitigate environmental degradation caused by the water crisis. In addition, investing in climate-resilient infrastructure, such as rainwater harvesting systems, water treatment facilities and irrigation technologies, can help improve water availability and quality while reducing pressure on natural water sources. Encouraging community participation in water resource management through education, capacity building and the promotion of sustainable livelihoods can also foster a sense of ownership and management of water resources. By adopting a holistic and proactive approach to deal with the environmental impacts of the water crisis in Cameroon, stakeholders can work together to preserve ecosystems, protect biodiversity and ensure the long-term sustainability of water resources for current and future generations.

In conclusion, the socio-economic and environmental impacts of the water crisis in Cameroon are important and multifaceted. The consequences on public health and the living

conditions of the populations are disastrous, with insufficient access to drinking water leading to water-borne diseases, malnutrition and poor sanitation practices. This, in turn, exacerbates poverty and hinders social development in the country. Cameroon's economic and social development is also negatively affected by the water crisis, as limited access to water hinders productivity, increases health care costs and hinders educational opportunities. In addition, the environmental impact of the water crisis is profound, with pollution, deforestation and habitat destruction threatening ecosystems and natural resources. Meeting these challenges requires a comprehensive approach that involves improving water infrastructure, promoting sustainable water management practices and involving stakeholders at all levels. By prioritizing the well-being of its population, promoting economic growth and protecting the environment, Cameroon can work for a more sustainable and resilient future for all its citizens.

CHAPTER4: FACTORS INFLUENCING ACCESS TO DRINKINGWATER AND SANITATION IN CAMEROON.

Access to safe drinking water and sanitation is a fundamental human right that is essential for health, well-being and sustainable development. In Cameroon, as in many other countries, the availability and quality of water and sanitation services are crucial issues that impact the daily lives of millions of people. This chapter explores the factors that influence access to safe drinking water and sanitation in Cameroon, highlighting the complex interplay of socio-economic, environmental, and governance factors that shape the water crisis in the country. Cameroon faces significant challenges in providing adequate water supply and sanitation services to its population, with disparities in access between urban and rural areas, as well as within different socio-economic groups. Understanding the factors that contribute to these disparities is crucial to developing effective strategies to improve access to safe drinking water and sanitation for all Cameroonians. This chapter will examine the socio-economic factors, environmental conditions, public policies, and governance structures that influence access to safe drinking water and sanitation in Cameroon. By analyzing these key determinants, we can better understand the root causes of the water crisis in the country and identify opportunities for intervention and improvement. Through an in-depth exploration of these factors, we aim to contribute to a better understanding of the challenges and opportunities to address these the water crisis in Cameroon and promoting sustainable access to drinking water.

1. Socio-economics factors

The water crisis in Cameroon is influenced by several socio-economic factors, including:

Limited access to drinking water: Many people in Cameroon, especially those living in rural areas, do not have access to safe and clean drinking water. This is often due to a lack of water supply and sanitation infrastructure; Poverty: Poverty is a major factor contributing to the water crisis in Cameroon. Many people cannot afford to access drinking water sources or pay for water treatment services. This leads to dependence on contaminated water sources, which can lead to waterborne diseases; Unequal distribution of resources: There is an unequal distribution of water resources in Cameroon, with some regions having better access to drinking water than others. This disparity is often linked to socio-economic factors such as wealth and political power; Urbanization: Rapid urbanization in Cameroon has put pressure on existing water infrastructure,

resulting in shortages of drinking water in cities. The lack of proper planning and investment in water supply systems aggravates the problem; Climate change: Climate change is also a contributing factor to the water crisis in Cameroon. Irregular rainfall patterns and prolonged droughts affect the availability of water, making it difficult for communities to access clean and reliable water sources. In addition, aggravates the shortage of water in Cameroon, leading to more frequent droughts and a reduction in the availability of water. This can have a significant impact on agriculture, food security and livelihoods; Lack of government intervention: Inadequate government policies and lack of investment in water infrastructure are contributing to the water crisis in Cameroon. The government's failure to prioritize water supply and sanitation services has left many communities without access to safe drinking water. Also, political instability in Cameroon can hinder efforts to solve the water crisis, because resources and attention can be diverted to other urgent problems. This can delay infrastructure development and water management initiatives.

In addition to these socio-economic factors, it is important to highlight the impact of armed conflicts and population displacements on the water crisis in Cameroon. Internal conflicts and forced displacement of populations often lead to additional pressure on available water resources, especially in conflict-affected areas. Water and sanitation infrastructure can be damaged or destroyed during conflicts, which further aggravates the situation and makes access to safe drinking water even more difficult for affected communities. Therefore, conflict resolution and the protection of displaced populations are also essential elements to be taken into account in the management of the water crisis in Cameroon.

2. Environmentals factors

In addition to socio-economic factors, environmental factors also play an important role in the water crisis in Cameroon. One of the main environmental factors is climate change, which has led to changes in rainfall patterns and an increased frequency of extreme weather events such as droughts and floods. These changes can affect the availability and quality of water sources, making it difficult for communities to access clean and safe water. Deforestation and land degradation are other environmental factors that contribute to the water crisis in Cameroon. The loss of forest cover and land degradation can lead to soil erosion, a reduction in water retention capacity and pollution of water sources. This, in turn, affects the quantity and quality of water available for consumption and sanitation purposes.

Pollution due to industrial activities, agricultural runoff and inadequate waste management practices also pose significant environmental challenges for water resources in Cameroon. Contamination of water sources with chemicals, heavy metals and pathogens can have serious consequences for the health of those who depend on these water sources for their daily needs. Addressing these environmental factors through sustainable land management practices, reforestation efforts, improving waste management systems and stricter regulations in the fight against pollution are essential steps to mitigate the water crisis in Cameroon and guarantee access to clean and safe water for all.

Basically, the environmental factors mentioned, rapid urbanization and population growth in Cameroon are aggravating the water crisis. As more and more people migrate to urban areas in search of better economic opportunities, the demand for water resources is increasing significantly. This puts pressure on existing water infrastructure and often leads to the overexploitation of groundwater and surface water sources, resulting in the depletion and contamination of these resources. In addition, inadequate water infrastructure and poor water management practices are contributing to the water crisis in Cameroon. Many communities, especially in rural areas, do not have access to basic water supply and sanitation services. The lack of appropriate infrastructure, such as water supply systems, storage facilities and treatment plants, hinders the reliable supply of clean and safe water to households. Inadequate sanitary facilities also contribute to the contamination of water sources, further aggravating the problem. In addition, political instability, corruption and the lack of effective governance in Cameroon have hampered efforts to address the water crisis. The limited government financing of hydraulic infrastructure projects, the lack of enforcement of regulations on pollution control and the weakness of institutional capacities in water management have all contributed to the persistent challenges to ensure access to drinking water for all Cameroonians.

To deal effectively with the water crisis in Cameroon, a multifaceted approach is necessary. This includes investing in the sustainable development of water infrastructure, promoting water conservation practices, implementing effective water management strategies and strengthening governance and regulatory frameworks. In addition, public awareness of the importance of water conservation and sanitation practices is crucial to foster a culture of responsible use of water and protection of water resources for future generations.

3. Public polices and gouvernance

Public policies and governance play a crucial role in solving the water crisis in Cameroon. Effective public policies are essential to guide the allocation of resources, set priorities and regulate activities related to water management. However, in Cameroon, there are several challenges related to public policies and governance that hinder efforts to deal with the water crisis. One of the key problems is the lack of coherent and comprehensive water policies in Cameroon. Although there are laws and regulations related to water management, they are often fragmented and are not effectively implemented. This leads to inconsistencies in decision-making and weak enforcement of regulations, which in turn contribute to the poor management of water resources. In addition, the governance structure of water management in Cameroon is characterized by overlapping mandates, unclear responsibilities and limited coordination between the various government agencies and stakeholders. This fragmentation hinders the effective delivery of water supply services and leads to inefficiencies in the allocation and use of resources. Strengthening the governance framework for water management through a clear delineation of roles and responsibilities, improved coordination mechanisms and effective stakeholder engagement is crucial to address the water crisis. Corruption and the lack of transparency in the water sector also pose significant challenges to effective water governance in Cameroon. Mismanagement of funds, embezzlement and corruption often undermine efforts to improve water infrastructure, ensure equitable access to water services and protect water resources. The fight against corruption through robust anti-corruption measures, transparency mechanisms and accountability processes are essential to build trust in the water sector and ensure that resources are used efficiently and effectively. In conclusion, the improvement of public policies and governance in Cameroon is essential to face the water crisis. By developing coherent and comprehensive water policies, strengthening governance structures, fighting corruption and promoting transparency and accountability, Cameroon can improve water management practices, ensure sustainable access to drinking water for all its citizens and protect its precious water resources for future generations.

In addition to meeting the challenges related to public policies and governance, several other factors must be taken into account in the efforts to combat the water crisis in Cameroon. An important aspect is the need to increase investments in water-related infrastructure and services. The lack of adequate infrastructure, such as water treatment plants, distribution networks and facilities hinder access to safe and clean water for many communities in Cameroon. By investing in the construction and maintenance of water infrastructure, the government can improve the

reliability, quality and coverage of water supply, thus reducing the prevalence of waterborne diseases and improving public health in general. In addition, the promotion of sustainable water management practices is essential to ensure the long-term availability and quality of water resources in Cameroon. This includes measures such as watershed protection, water conservation and integrated water resource management. By protecting the watersheds from deforestation, pollution and degradation, Cameroon can safeguard its freshwater sources and its ecosystems. Encouraging water conservation practices among individuals, companies and industries can help reduce water waste and ensure efficient use of limited water resources. The implementation of integrated water resource management approaches that take into account the interdependence of water sources, such as rivers, lakes and underground aquifers, can help optimize water allocation and minimize conflicts over water use.

Education and awareness-raising initiatives are also essential to address the water crisis in Cameroon. By raising awareness of the importance of water conservation, hygiene practices and sustainable water management, the government can empower communities to take measures to protect and preserve their water resources. Education programs on water-related issues, such as the impacts of climate change on water availability, the importance of sanitation and hygiene for public health and the rights to drinking water and sanitation, can help to establish a culture of water management among the population.

Finally, fostering partnerships and collaboration between government agencies, civil society organizations, the private sector and local communities is essential to address the water crisis in Cameroon. By working together towards common goals, sharing knowledge and resources and engaging stakeholders in decision-making processes, these partnerships can improve the effectiveness of water management initiatives and ensure that they are inclusive, participatory and sustainable. Building strong partnerships can also help mobilize additional funds, expertise and technical support for the implementation of water-related projects and programs throughout the country.

In conclusion, addressing the water crisis in Cameroon requires a multifaceted approach that includes not only improvements in public policies and governance, but also investments in water infrastructure, the promotion of sustainable water management practices, education and awareness-raising efforts, and the promotion of partnerships and collaboration between the various stakeholders. By adopting a holistic and integrated approach to water management, Cameroon can

work to achieve universal access to safe and clean water for all its citizens while preserving its precious water resources for future generations. In conclusion, the factors influencing access to drinking water and sanitation in Cameroon are multifaceted and interconnected. Socio-economic factors such as income levels, education and urbanization play an important role in determining access to drinking water and sanitation services. Environmental factors, including climate change, deforestation and pollution, have an impact on the availability and quality of water resources in the country. In addition, public policies and governance structures influence the planning, implementation and regulation of water management initiatives. Addressing these factors requires a global and coordinated approach that integrates social, economic, environmental and governance considerations to ensure sustainable and equitable access to drinking water and sanitation for all Cameroonians.

	Unstandardized Coefficients		Standardized Coefficients		
Variables	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	.380	2.044		.186	.853
Water source distance from home	.314	.102	.177	3.077	.002
Water sufficiency for household members	1.840	.857	.122	2.147	.033
Frequency of water shortages	.461	.228	.123	2.019	.044
Estimated monthly household income	-.235	.091	-.168	-2.576	.011
Main source of livelihood income	-.282	.111	-.160	-2.541	.012
Problems with water supply	-.437	.544	-.045	-.802	.423

Fig 3: Factors influencing access to safe drinking water

PART III: STRATEGIES AND SOLUTIONS TO OVERCOME THE WATER AND SANITATION CRISIS IN CAMEROON.

Access to drinking water and sanitation in Cameroon is a real problem that affects the populations of this Central African country. The remoteness of the water points, the difficulty of drawing, the unsanitary water, the intermittency of the service, the queues around the water points and defective sanitation are recurring obstacles to access to drinking water and sanitation. Despite the local initiatives promoted by the implementation of decentralization, the quantities of water available are insufficient to satisfy the needs of a growing population. The water consumed by the populations exposes them to serious health risks. After the diagnosis, this chapter aims to address the challenges of access to drinking water and sanitation. In other words, the aim is to propose concrete actions that can improve people's access to drinking water and sanitation. In other words, the water and sanitation crisis in Cameroon poses significant challenges to the population, the economy and the environment of the country. In response to this urgent problem, it is crucial to implement effective strategies and solutions to guarantee access to drinking water and sanitation for all. By addressing the root causes of the crisis and promoting sustainable water management practices, Cameroon can improve public health, strengthen economic development and safeguard its natural resources. In this section, we will explore the key strategies and solutions to overcome the water and sanitation crisis in Cameroon and create a more resilient and water-secure future for its citizens.

- Decentralization and access to drinking water and sanitation in Cameroon: Decentralization in Cameroon has had a significant impact on access to drinking water and sanitation. With the decentralization process, local governments have been given more authority and responsibility to manage water and sanitation services in their communities. This has led to more efficient and effective management of resources, as well as increased accountability and transparency in service delivery. One of the main challenges in Cameroon is the unequal distribution of water and sanitation services, as rural areas often do not have access to drinking water and adequate sanitation facilities. Decentralization has allowed local governments to prioritize these areas and allocate resources accordingly, which has improved access to drinking water and sanitation for rural communities. In addition, decentralization has also encouraged the participation and involvement of communities in decision-making processes related to water and sanitation services. This has led to more sustainable and community-oriented solutions, as well as increased

ownership and responsibility for the maintenance of water supply and sanitation infrastructure. Overall, decentralization has played a crucial role in improving access to drinking water and sanitation in Cameroon by empowering local governments, promoting community participation and ensuring more efficient and effective service delivery.

- Cooperation between actors in water and sanitation management: The texts relating to decentralization provide for the support that must be provided to municipalities in the exercise of their powers. According to article 11 of the decree n ° 2010/00000298 / A/MINEE of September 1, 2010, the Ministry in charge of Water provides technical support to municipalities by organizing training courses that allow DCS to acquire either the necessary technical capacity or the ability to mobilize external technical expertise. However, the reality is different on the ground. At the end of the interviews conducted with the technical service of the municipalities, no capacity-building seminar was organized by the regional and departmental water services. Each actor acts according to the means that are specific to him. The repercussions of this individualism are visible on the ground. The various water services operate in isolation. Meeting the challenge of improving access to drinking water cannot be limited to the simple construction of infrastructures. This reductive vision probably constitutes one of the main challenges of access to drinking water. We must go beyond the myth of technology to encourage a holistic approach to water and sanitation services. Concerns related to the management of systems, behaviors and practices must be taken into account by public policies. To achieve these objectives, local actors must collaborate and work together. Working in synergy will make it possible to have reliable information on the state of access to drinking water and sanitation in Cameroon. In the urban centers of the country, the CAMWATER manifests reluctance to collaborate with the decentralized structures of the MINEE and the CTD probably because their service seems not to meet the expectations of the clientele.
- The need for strong involvement of local populations in the management of water and sanitation works: The participation of beneficiaries is the guarantee of the success of water and sanitation projects. According to Bonnal (1995), quoted by Simard (2008), "The participation of the populations consists in restoring to them a power of initiative in the definition and the implementation of the actions and programs which concern their own future. This means that external stakeholders and states recognize peasants, herders, artisans, etc. as development actors, full partners and not as the targets of an external project or the means to implement decisions taken without them (...). An intervention is

therefore participatory only if it results from explicit and negotiated compromises between the interests of the various actors. "It emerges from the above that the participation of local populations in the realization of development projects is essential for their success. Unfortunately, the promoters or initiators of water and sanitation projects in the country have not been able to learn from the failure of the SCANWATER network. The lack of participation was at the origin of the abandonment of these hydraulic works. Very few projects implemented in the country involve local populations in their chain of realization. The populations undergo the works that are made available to them. The management method is not negotiated upstream with the main beneficiaries. The populations are informed of the management methods only during the commissioning of the works; which contributes to the rejection of several works. The main challenge is to manage drinking water access structures in a sustainable way.

1- Sustainable water management approaches (Government programs)

Water conservation programs are essential to promote responsible water use and reduce overall water consumption. These programs can include initiatives such as public education campaigns to raise awareness of the importance of conserving water, as well as information on simple steps that individuals can take to reduce water waste in their daily lives. In addition, governments can offer incentives for water-efficient appliances and appliances, as well as discounts for repairing leaks and installing water-saving devices; water recycling and reuse programs are essential to maximize the use of available water resources. Governments can invest in wastewater treatment and recycling infrastructure for non-potable purposes such as irrigation, industrial processes and flushing toilets. By implementing these programs, governments can reduce the pressure on freshwater sources and ensure a more sustainable water supply for the future; stormwater management programs are important to mitigate the impacts of urban development on water quality and quantity. Green infrastructure projects, such as rain gardens, permeable roadways and green roofs, can help capture and treat stormwater runoff before it enters water bodies. By implementing these programs, governments can reduce pollution and erosion, protect aquatic habitats and recharge groundwater reserves; watershed protection programs are essential to preserve the health of ecosystems and ensure a sustainable supply of drinking water. Governments can work with stakeholders to develop land use plans that prioritize water quality and quantity, establish conservation easements to protect critical areas, and implement restoration projects to improve

ecosystem functions. By protecting watersheds, governments can maintain healthy ecosystems that provide essential services such as water filtration, flood control and wildlife habitat; water pricing and regulation play a key role in promoting efficient water use and discouraging wasteful practices. Governments can implement policies such as tiered pricing based on usage levels to incentivize conservation, as well as regulations to limit water waste in sectors such as agriculture, industry and landscaping. By implementing these measures, governments can encourage responsible water use and ensure that water resources are used sustainably for future generations.

Education and public awareness programs are essential to involve the community in water conservation efforts. Governments can develop campaigns to inform the public about the importance of conserving water, as well as provide resources and tools for individuals and companies to reduce their water footprint. By sensitizing stakeholders and empowering them, governments can foster a culture of conservation and ensure the long-term sustainability of water resources.

In addition to the aforementioned water conservation programs, governments can also consider implementing water-efficient building codes and standards to promote sustainable practices in construction and development. By requiring new buildings to incorporate water-saving features such as low-flow appliances, water-efficient appliances and rainwater harvesting systems, governments can reduce water demand in urban areas and minimize the pressure on water resources. In addition, governments can offer incentives or tax breaks to developers who adhere to these standards, encouraging the adoption of water-efficient technologies in the built environment. Investing in research and development of innovative water technologies can also play a crucial role in promoting water conservation efforts. Governments can support research initiatives aimed at developing new water-saving technologies, such as intelligent irrigation systems, leak detection devices and advanced water treatment technologies. By encouraging innovation in the water sector, governments can improve efficiency, reduce water waste and improve the sustainability of water resources for future generations. Collaboration with stakeholders and partnerships with local communities are essential for the success of water conservation programs. Governments can work with water utilities, businesses, non-profit organizations and community groups to develop and implement comprehensive water conservation strategies. By involving stakeholders in the decision-making process and promoting collaboration between various partners, governments can leverage collective expertise and

resources to have a significant impact on water conservation efforts. Monitoring and evaluating water conservation programs is essential to assess their effectiveness and make informed decisions on future initiative. Governments can establish monitoring systems to monitor trends in water use, assess the impact of conservation measures and identify areas for improvement. By collecting data on water consumption, leakage rates and conservation practices, governments can measure progress towards conservation goals and adjust strategies as needed to ensure long-term success.

Overall, a holistic approach to water conservation that integrates education, regulation, infrastructure investments, technological innovation, stakeholder engagement and monitoring and evaluation is essential to promote sustainable water management practices. By implementing a comprehensive series of programs and initiatives that address various aspects of water conservation, governments can effectively protect and preserve precious water resources for current and future generations.

2- Local and international initiatives to improve access to water in Cameroon (Actions of international organizations and NGOs)

In Cameroon, local and international initiatives have been implemented to improve access to water and sanitation services, with the support of international organizations and non-governmental organizations (NGOs). International organizations such as the United Nations Children's Fund (UNICEF), the World Health Organization (WHO) and the World Bank have played a crucial role in supporting water and sanitation projects in Cameroon.

- One of the main actions of international organizations in Cameroon has been to provide technical and financial assistance for the development of hydraulic infrastructure, such as drilling boreholes, the construction of water supply systems and the construction of sanitation facilities in rural and urban areas. These initiatives aim to increase access to clean and safe drinking water for communities that are currently underserved or lack adequate water sources.
- NGOs working in Cameroon have also been actively involved in improving access to water and sanitation services. Organizations such as WaterAid, Oxfam and CARE International have implemented various projects to promote hygiene education, build latrines and establish community water management systems. These initiatives not only focus on the provision of physical infrastructure, but also highlight the importance of

behavioral change and community participation to ensure sustainable access to water and sanitation services.

- In addition, international organizations and NGOs have collaborated with the Cameroonian government to develop policies and strategies for water resources management and sanitation. By collaborating with local authorities and communities, these organizations have contributed to strengthening institutional capacities, improving governance structures and promoting sustainable practices in the water sector.
- Overall, the combined efforts of international organizations and NGOs in Cameroon have contributed significantly to improving access to water and sanitation services for vulnerable populations. By leveraging their expertise, resources and networks, these organizations have helped to address the critical water challenges in the country and make progress towards achieving the Sustainable Development Goals related to water and sanitation.

In addition to the efforts of international organizations and NGOs, the Cameroonian government has also taken measures to improve access to water and sanitation services in the country. The government has developed national policies and strategies to address water and sanitation challenges, such as the National Water Sector Development Strategy and the National Water and Sanitation Policy. These frameworks provide a roadmap for the development of water resources, infrastructure and services, with an emphasis on ensuring equitable access for all citizens. In addition, the government has invested in water infrastructure projects, such as the construction of water treatment plants, distribution networks and sanitation facilities in urban and rural areas. These initiatives aim to expand access to drinking water and improve sanitation conditions for communities across the country. In addition, the Government has worked to strengthen regulatory frameworks, establish monitoring systems and strengthen institutional capacities to ensure the sustainable management of water resources and sanitation services. The commitment and participation of communities have also been key elements of the government's approach to improve access to water and sanitation in Cameroon. The local communities are involved in the decision-making processes, the planning and the implementation of the projects, which makes it possible to ensure that the interventions are adapted to their specific needs and priorities. By giving communities, the means to take ownership of water and sanitation projects, the government promotes a sense of responsibility and sustainability among local residents. In

addition, the government has collaborated with international organizations, NGOs and other stakeholders to leverage resources, expertise and best practices in the water sector. Through partnerships and coordination efforts, the government has been able to maximize the impact of interventions, fill gaps in service delivery and scale up successful initiatives to reach more communities in need. Overall, the combined efforts of the Cameroonian government, international organizations, NGOs and local communities have played a decisive role in improving access to water and sanitation services in the country. By working together towards common objectives, these stakeholders are making significant progress towards achieving universal access to drinking water and adequate sanitation for all citizens in Cameroon.

3- **Recommendations for a better management of the water resource (Good practices and innovations)**

To ensure better management of water resources in Cameroon, several recommendations can be implemented on the basis of good practices and innovations. First, the promotion of water conservation practices among the population is crucial. This can include the implementation of water-saving technologies in households, industries and agriculture, as well as raising awareness of the importance of water conservation through education campaigns and community outreach programs.

- Secondly, it is essential to invest in sustainable water infrastructure. This involves the development of efficient water supply systems, including the construction of water treatment plants, distribution networks and storage facilities. In addition, the integration of green infrastructure solutions, such as rainwater harvesting systems and natural water purification methods, can help reduce the pressure on freshwater sources and strengthen resilience to the impacts of climate change.
- In addition, the adoption of integrated approaches to water resource management is essential to ensure the sustainable use of water resources. This implies taking into account the interdependence of water-related sectors, such as agriculture, energy and sanitation, in decision-making processes. By promoting cross-sectoral collaboration and coordination, stakeholders can optimize the use of water resources while minimizing conflicts and promoting equitable access for all users.
- Innovations such as remote sensing technologies, data analysis and real-time monitoring systems can also play an important role in improving water resource management. These tools can provide valuable information on the availability, quality and modes of water use,

allowing decision-makers to make informed choices and respond quickly to emerging challenges.

- Finally, it is essential to promote partnerships and collaboration between government agencies, private sector entities, civil society organizations and local communities for effective management of water resources. By working together towards common goals, sharing knowledge and resources and engaging stakeholders in decision-making processes, a more holistic and inclusive approach to water management can be achieved. By implementing these recommendations based on good practices and innovations, Cameroon can strengthen the sustainability of its water resources, improve access to drinking water for all citizens and mitigate the impacts of water scarcity and pollution in the country.

In addition to the recommendations mentioned above, several other strategies can be implemented to improve the management of water resources in Cameroon. A key aspect is the need for effective water governance structures and policies. Strengthening institutional capacities, improving regulatory frameworks and promoting transparent and participatory decision-making processes are essential to ensure the sustainable management of water resources. By establishing clear roles and responsibilities for the various stakeholders, setting up monitoring mechanisms and ensuring compliance with water-related laws and regulations, the government can create an enabling environment for effective management of water resources. Another important consideration is the integration of climate change adaptation strategies into water management practices. As climate change continues to impact rainfall patterns, water availability and extreme weather events, it is crucial to develop resilience measures that can mitigate the risks associated with these changes. This can include implementing nature-based solutions, such as restoring wetlands and forests to improve water retention and reduce runoff, as well as investing in climate-resilient infrastructure that can withstand future climate-related challenges. In addition, the promotion of sustainable agricultural practices is essential to reduce water consumption and pollution in Cameroon. Agriculture is a major consumer of water in the country, and inefficient irrigation methods, chemical runoff and soil erosion can have adverse effects on water quality and availability. By promoting agroecological approaches, such as conservation agriculture, organic farming and agroforestry, farmers can reduce their water footprint, improve soil health and improve ecosystem services that support water resources. In addition, it is essential to fight against water pollution by industrial activities, mining operations and urban areas to preserve water quality in Cameroon. The implementation of pollution control measures, the enforcement of

environmental regulations and the promotion of environmentally friendly technologies can help prevent contamination of water sources and protect aquatic ecosystems. Public-private partnerships can also play an important role in promoting sustainable industrial practices and investing in wastewater treatment facilities in order to minimize pollution levels. Overall, a holistic approach combining conservation efforts, infrastructure development, political reforms, climate adaptation measures, sustainable agricultural practices and pollution control strategies is necessary to ensure the long-term sustainability of water resources in Cameroon. By integrating these additional recommendations into existing water resource management initiatives, the country can meet current challenges and effectively strengthen its resilience to future water-related risks.

What are the innovative solutions that I can bring in this thesis to solve the problem that is the water crisis in Cameroon?

We also have some criteria not to be overlooked, namely that All water treatment structures, i.e. production, transport and water distribution structures are autonomous in terms of energy, i.e. water treatment plants, castles and all pumping structures that they no longer depend on the company that supplies electricity, because 60% to 80% of water cuts in Cameroon are due to the fact that there is an upstream power cut.

The division of the city into districts: The cities must be divided into districts because the division of our cities into districts allows each of them to be autonomous and it will have a small water treatment plant for a very specific number of subscribers, for a very specific area and by doing so the city will therefore have a multitude of water treatments for each district and they can, by the principle of interconnection, share water when one of the water stations is down. Whereas when we have a large water treatment plant for the whole city when it has a problem the transport of water to the other points of the city cannot work it is the whole city that is stopped.

At the infrastructure level, we can note the quality criteria of a water, sanitation and hygiene project. It emerges from the above analysis that the sustainability of a water supply, sanitation and hygiene project and the effects induced depend closely on the capacity of the applicant, the technical and financial capacity, the relevance, the consistency and the methodology adopted to achieve the intended objective.

Ability of the applicant: Whoever applies for a grant from the funders must have sufficient experience in project management. He must be able to show that he has the skills required to complete the project or ensure the proper management of the project. If the community or the association supporting the project does not have the necessary skills, it will be able to mobilize expertise by surrounding itself with resource people capable of strengthening its capacities.

Technical and financial viability: This second criterion relates to skills in technical and financial engineering. The technical and financial viability makes it possible to ensure, on the one hand, that the proposed technical solution is the best adapted to the real needs of the populations and, on the other hand, that the various costs linked to the project are justified.

Relevance: It consists in ensuring that the project and the various actions resulting from it have the reason for being a with regard to local needs and the realities of the intervention context. A project is relevant if it responds to a request expressed by the competent local authority and the priority needs of the beneficiaries, if it fits into the national, regional and local water and sanitation policy and if it is in line with other actions carried out in the area.

Consistency: It consists of verifying that the way of doing the project has been designed logically. It is checked that the objectives of the project have been well justified, that the activities undertaken or scheduled will make it possible to achieve the intended goal. Finally, it is a question of seeing if the means mobilized will make it possible to carry out the programmed activities.

Methodology: It refers to the different methods of intervention and achievements adopted. First, the potential beneficiaries must be identified. Then, they must be associated with all stages of the project, from formulation to implementation. A popular saying state that: "a project for the people, without the people is against the people". The involvement of the beneficiaries in all phases of the project ensures the guarantee of a viable management of the infrastructures. Finally, the sharing of roles and responsibilities between the various actors mobilized within the framework of the project must be carried out.

- Sustainability: It concerns the impact of the project over a long period after its completion. Sustainability implies in the long term the appropriate use and the good condition of the infrastructures provided, the conservation and the use of the knowledge acquired by the beneficiaries during the project. It also implies the continuity of the organization of the community developed by the project (CGPE, CUE, EEC). It is tested by questions such as

"will permanent actors guarantee the sustainability of the objectives of the program once the project is completed? Have the host country and the beneficiaries appropriated the project and do they have the motivation and the capacity to continue? ».

- Effects The establishment of a public water and sanitation service must lead to changes that can be economic, social, institutional or political. On the socio-economic level, for example, the realization of a project of access to drinking water and sanitation should contribute to the reduction of distances to draw water or the creation of new jobs in the locality.

Always in the innovative solutions to face the water crisis in Cameroon, we can consider:

➢ Water collection and storage technologies: Explore the use of innovative water collection and storage technologies, such as rainwater collection systems, anti-fog nets and underground water storage tanks. These solutions can help capture and store rainwater for domestic, agricultural and industrial use, especially during periods of water shortage.

➢ Intelligent water management systems: Integrate intelligent water management systems that leverage technology, such as sensors, data analysis and remote monitoring, to optimize water use efficiency, detect leaks and prevent water waste. These systems can provide real-time information on water consumption patterns and help improve water resource management practices.

➢ Community water management initiatives: Develop community water management initiatives that allow local communities to appropriate their water resources. This may involve setting up community water committees, implementing participatory water governance structures, and promoting community-led conservation efforts to protect water sources.

➢ Community water management initiatives: Develop community water management initiatives that allow local communities to appropriate their water resources. This may involve setting up community water committees, implementing participatory water governance structures, and promoting community-led conservation efforts to protect water sources.

➢ Water recycling and reuse: Study the potential for the implementation of water recycling and reuse systems in various sectors, such as agriculture, industry and urban areas. By treating and reusing wastewater for non-potable purposes, such as irrigation, industrial processes and

sanitation, you can reduce the demand for fresh water resources and minimize the pollution of water bodies.

➢ Climate Resilient Infrastructure: Focus on the design and implementation of climate resilient infrastructure projects that can withstand extreme weather events, such as floods and droughts, and guarantee reliable access to drinking water. This can include the construction of resilient water supply systems, flood protection measures and sustainable drainage solutions that can adapt to changing climatic conditions.

➢ Capacity building and Education programs: Develop capacity building programs and educational initiatives that raise awareness of water conservation practices, promote sustainable water use behaviors and develop technical skills in water resource management. By giving individuals and communities the necessary knowledge and skills, you can foster a culture of water stewardship and promote long-term sustainability.

SWOT ANALYSIS

Involve urban planners and real estate developers in the water distribution process, that is to say bring real estate developers in the sense that each time when they are going to open a new community, they can reassure themselves that it has a water treatment plant or that it can be attached to a specific district.

To be even clearer, we can apply the SWOT analysis to work with strategies and solutions to overcome the water and sanitation crisis in Cameroon.

The water and sanitation crisis in Cameroon poses an important challenge that requires strategic planning and innovative solutions to face it effectively. By applying the SWOT analysis framework, we can identify the strengths, weaknesses, opportunities and threats associated with the current situation. This analysis will allow us to develop strategies and targeted solutions to overcome the challenges and improve access to drinking water and sanitation services for all communities in Cameroon. Join us to deepen this crucial topic and explore how SWOT analysis can guide us in the search for sustainable solutions to the water and sanitation crisis in Cameroon.

1. Strengths of the water and sanitation sector in Cameroon

❖ Natural water resources: Cameroon has abundant water resources, including rivers, lakes and groundwater sources, which can be exploited to provide drinking water to the population. This abundance of water resources represents a considerable advantage for the development of the sector. The country already has a number of water treatment plants and sanitation facilities, although their capacity and geographical coverage are still limited. This existing infrastructure can serve as a basis for expanding and improving water and sanitation services in the country.

❖ Political Will: The Government of Cameroon is committed to improving access to drinking water and sanitation services through various policies, programs and initiatives.

❖ Presence of international organizations: International organizations such as UNICEF, WHO and NGOs are actively involved in supporting water and sanitation projects in Cameroon, providing technical expertise and financial resources. Collaboration with stakeholders, the water and sanitation sector in Cameroon involves collaboration between government agencies, NGOs,

international organizations and local communities, promoting a multi-stakeholder approach to meet the challenges.

❖ Innovation Potential: There is a potential for innovation in the water and sanitation sector in Cameroon, including the adoption of new technologies and approaches to improve the delivery and efficiency of services. All in all, these assets constitute a solid basis for dealing with the water and sanitation crisis in Cameroon and working for sustainable solutions for all communities.

2. Weaknesses of the water and sanitation sector in Cameroon

Here we can highlight several shortcomings namely:

❖ Outdated infrastructure: The water and sanitation infrastructure in Cameroon is inadequate and in poor condition, which translates into high water losses, frequent outages and poor water quality, which limits access to drinking water and sanitation facilities, especially in rural areas. Many communities lack basic water supply systems and adequate sanitation facilities, which contributes to the spread of waterborne diseases.

❖ Limited financing: The water and sanitation sector in Cameroon is facing financing constraints, with insufficient financial resources allocated to infrastructure development, maintenance and service delivery. This lack of funding hinders the implementation of sustainable water and sanitation projects and limits the scope of services to underserved populations.

❖ Governance and institutional capacity: The governance and institutional capacity of the water and sanitation sector in Cameroon are weak, which leads to challenges in the implementation of policies, coordination between stakeholders and monitoring of service delivery. There is a need to improve regulatory frameworks, capacity building and accountability mechanisms to ensure effective management of water resources and sanitation services.

❖ Climate Change Impacts: Cameroon is vulnerable to the impacts of climate change, including droughts, floods and irregular rainfall patterns, which can affect the availability and quality of water. Climate change is exacerbating existing water and sanitation challenges in the country, requiring adaptation measures and resilience-building efforts to mitigate its effects on the sector.

❖ Limited data and information: There is a lack of comprehensive data and information on water resources, sanitation coverage and service quality in Cameroon, which hinders evidence-based decision-making and planning in the sector. Improved data collection, monitoring and evaluation mechanisms are needed to inform policy development, resource allocation and performance evaluation in the water and sanitation sector.

Overall, addressing these weaknesses in the water and sanitation sector in Cameroon requires concerted efforts by government authorities, development partners, civil society organizations and local communities to improve infrastructure, increase financing, strengthen governance structures, strengthen resilience to climate change, promote equity in access and improve data management for informed decision-making.

3. Opportunities to improve water and sanitation in Cameroon

Despite its multiple weaknesses in solving water problems in Cameroon, we also have multiple opportunities to remedy this.

❖ Increased investment and financing opportunities: There are opportunities to attract more investment and financing for water and sanitation projects in Cameroon through partnerships with development banks, international donors and private sector entities. Leveraging these financial resources can help improve infrastructure, expand service coverage and strengthen the sustainability of water and sanitation services in the country.

❖ Public-private partnerships: Involving the private sector in the provision of water and sanitation services through public-private partnerships (PPP) can provide expertise, innovation and efficiency in service delivery. Collaboration with private companies can help to fill the infrastructure gap, improve operational efficiency and improve the quality of water and sanitation services for communities in Cameroon.

❖ Technology and innovation: The adoption of new technologies and innovative solutions can revolutionize the water and sanitation sector in Cameroon. From mobile payment systems for paying water bills to remote monitoring of water quality, technology can improve service delivery, improve data management and increase access to information for service providers and users.

❖ Community participation and empowerment: Empowering local communities to actively participate in decision-making processes, project planning and management of water and sanitation facilities can lead to more sustainable results. Community-based approaches, such as water user committees and hygiene promotion campaigns, can promote ownership, accountability and long-term sustainability of water and sanitation initiatives.

❖ Capacity building and Training: Investing in capacity building and training programs for water and sanitation professionals, government officials, community leaders and service providers can strengthen the human resources and institutional capacities of the sector. Strengthening technical skills, promoting good governance practices and improving knowledge sharing can improve service delivery, policy implementation and the overall performance of the sector in Cameroon.

❖ Climate-resilient infrastructure: The integration of climate-resilient design principles into water and sanitation infrastructure projects can help mitigate the impacts of climate change on water resources and sanitation services. The implementation of measures such as rainwater harvesting systems, flood protection mechanisms and drought-resistant technologies can strengthen the sector's resilience to climate-related challenges and ensure long-term sustainable service delivery.

❖ Reform of policies and regulatory frameworks: Strengthening policy frameworks, regulatory mechanisms and institutional structures for the water and sanitation sector can create an enabling environment for sustainable development. Updating laws, regulations and standards, as well as improving coordination between government agencies and stakeholders, can improve governance, accountability and transparency in the sector.

❖ Intersectoral Collaboration: Promoting collaboration between sectors such as health, education, agriculture and the environment can maximize the impact of water and sanitation interventions on overall development results. Integrating water and sanitation considerations into broader development strategies, programs and policies can create synergies, optimize resources and improve the well-being of communities in Cameroon.

❖ Awareness and communication for behavior change: The conduct of awareness campaigns, communication initiatives for behavior change and hygiene promotion activities can sensitize Cameroonian communities to the importance of drinking water and sanitation practices. Educating the public on appropriate hygiene behaviors, water conservation techniques and best sanitation

practices can help prevent waterborne diseases, improve health outcomes and promote the sustainable use of water resources.

❖ Monitoring and Evaluation mechanisms: The establishment of robust monitoring and evaluation systems to monitor progress, measure the impact and evaluate the effectiveness of water and sanitation interventions is essential for evidence-based decision-making. Regular monitoring of service delivery indicators, water quality parameters, coverage rates and user satisfaction levels can inform policy adjustments, resource allocation decisions and performance improvements in the sector.

By seizing these opportunities to improve water and sanitation in Cameroon through strategic investments, innovative solutions, community engagement, capacity building, political reforms, intersectoral collaboration, awareness-raising efforts and monitoring mechanisms, the country can make significant progress towards achieving universal access to drinking water and sanitation for all its citizens.

4. Threats to the water and sanitation sector in Cameroon

The water and sanitation sector in Cameroon are facing several threats that hinder its ability to provide safe and sustainable services to the population. One of the main threats is inadequate infrastructure, including aging and poorly maintained water supply systems, inadequate sanitation facilities and limited access to safe drinking water sources. The lack of adequate infrastructure contributes to water scarcity, poor water quality and inadequate sanitation practices, resulting in health risks and environmental degradation. Another important threat is the impact of climate change on water resources and sanitation services in Cameroon. Changing weather conditions, the increased frequency of extreme weather events and rising temperatures can exacerbate water scarcity, droughts, floods and waterborne diseases. Climate-related challenges pose a significant risk to the availability, reliability and quality of water resources, as well as to the sustainability of sanitation facilities in the country.

In addition, insufficient financing and financial constraints represent a major threat to the water and sanitation sector in Cameroon. Limited budget allocations, insufficient investments in infrastructure development and high operational costs hinder the sector's ability to expand service coverage, improve service quality and ensure long-term sustainability. The lack of financial

resources also affects the ability of water and sanitation service providers to maintain existing infrastructure, implement new projects and meet the growing demand for services. Poor governance, weak institutional capacities and ineffective regulatory frameworks are other threats that hinder progress in the water and sanitation sector in Cameroon. Inadequate coordination between government agencies, a lack of transparency in decision-making processes and limited accountability mechanisms contribute to inefficiency, corruption and mismanagement in the sector. The absence of clear policies, regulations and enforcement mechanisms undermines efforts to promote good governance, ensure compliance with standards and improve the performance of the sector. In addition, rapid urbanization, population growth and inadequate urban planning pose challenges to water supply and sanitation services in urban areas of Cameroon. The growing demand for water and sanitation services in urban centers is straining existing infrastructure, leading to overcrowding, informal settlements and insufficient access to basic services. Problems related to urbanization such as pollution, waste management and land degradation further exacerbate the challenges facing the water and sanitation sector in urban areas.

In conclusion, addressing these threats to the water and sanitation sector in Cameroon requires concerted efforts by government authorities, development partners, civil society organizations and other stakeholders. By investing in infrastructure modernization, climate-resilient solutions, financial sustainability measures, governance reforms and urban planning initiatives, Cameroon can overcome these challenges and guarantee access to drinking water and sanitation to all its citizens.

5. Strategies for leveraging strengths and opportunities

To take advantage of the strengths and opportunities in the water and sanitation sector in Cameroon, stakeholders can focus on building on the existing positive aspects and seize potential improvement paths. A key strategy is to capitalize on the country's natural resources, such as abundant water sources, to improve water supply systems and increase access to drinking water. By investing in the development, maintenance and modernization of infrastructure, Cameroon can optimize its water resources to meet the growing demand for drinking water.

❖ Mobilizing Investments: Exploiting the opportunities of external financing and public-private partnerships to mobilize the investments necessary for the modernization and extension of water and sanitation infrastructures. Another strategy is to take advantage of partnerships with

development agencies, international organizations and private sector entities to mobilize financial resources, technical expertise and innovative solutions to improve water and sanitation services. Collaboration with external partners can help fill funding gaps, support capacity-building initiatives and implement sustainable projects that benefit communities across the country.

❖ Capacity Building: Set up training and skills development programs to equip local authorities and businesses with the required technical, management and financing capacities. In addition, taking advantage of technological advances and digital tools can improve monitoring, data collection and information management in the water and sanitation sector. By adopting smart technologies, remote sensing systems and data analysis platforms, Cameroon can improve operational efficiency, optimize resource allocation and improve service delivery in urban and rural areas.

❖ Promote Innovation: Encourage the adoption of innovative technologies that improve the efficiency, quality and sustainability of water and sanitation services, taking advantage of the abundant water resources of the country. Strengthening governance mechanisms, improving regulatory frameworks and promoting transparency and accountability in decision-making processes are crucial strategies to ensure effective management of water and sanitation services. By establishing clear policies, applying regulations and promoting stakeholder engagement, Cameroon can create an environment conducive to sustainable development in the sector.

In addition, taking advantage of community participation, promoting communication for behavior change and empowering local actors are essential strategies to improve access to water and sanitation services at the local level. By involving communities in the planning, implementation and monitoring of projects, Cameroon can promote ownership, sustainability and social inclusion of service delivery initiatives. Overall, by taking advantage of assets such as natural resources, partnerships, technology, governance and community engagement, Cameroon can capitalize on the opportunities to improve water and sanitation services and overcome the challenges of the sector. By adopting a holistic approach that integrates these strategies, stakeholders can work together to achieve the sustainable development goals and guarantee access to drinking water and sanitation for all citizens in Cameroon.

6. Solutions to overcome weaknesses and threats

To remedy the weaknesses and threats in the water and sanitation sector in Cameroon, stakeholders can focus on the implementation of targeted interventions to improve infrastructure, strengthen governance mechanisms and promote sustainable practices. A key solution is to invest in the modernization and expansion of existing water supply systems to solve problems such as aging infrastructure, leaks and inefficiencies. By giving priority to the development and maintenance of infrastructure, Cameroon can ensure reliable access to drinking water for its population.

❖ Infrastructure Rehabilitation: Investing in the modernization of outdated water and sanitation infrastructures, in order to reduce water losses and improve the reliability and quality of services; Expansion of Coverage: Extending water and sanitation networks, in particular in rural areas and disadvantaged neighborhoods, to guarantee equitable access to essential services; Environmental Protection: Implementing measures to protect water resources and the environment, in order to secure long-term water supply and prevent conflicts related to access to water.

❖ Strengthening regulatory frameworks, strengthening institutional capacities and promoting transparency and accountability in decision-making processes are essential solutions to address governance challenges in the sector. By establishing clear policies, applying regulations and promoting good governance practices, Cameroon can create an enabling environment for effective management of water and sanitation services.

❖ In addition, the promotion of sustainable practices, such as water conservation, recycling and reuse, can help mitigate threats related to water scarcity, pollution and climate change. By raising awareness of the importance of sustainable water management practices and by implementing initiatives aimed at reducing water waste and pollution, Cameroon can safeguard its water resources for future generations.

❖ In addition, engaging with local communities, empowering marginalized groups and promoting inclusive participation are crucial solutions to overcome social and economic barriers to access to water and sanitation services. By involving communities in decision-making processes, addressing gender disparities and promoting social equity, Cameroon can guarantee all citizens equal access to drinking water and sanitation facilities. Overall, by implementing targeted interventions to address weaknesses related to infrastructure, governance, sustainability and social inclusion, Cameroon can overcome the threats to the water and sanitation sector and achieve the sustainable development goals. By adopting a global approach that integrates these solutions, stakeholders can

work to build a resilient and inclusive water and sanitation system that meets the needs of all citizens in Cameroon.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the SWOT analysis conducted for the water and sanitation sector in Cameroon made it possible to identify the main strengths, weaknesses, opportunities and threats that must be faced to improve access to drinking water and sanitation services for all citizens. Leveraging assets such as natural water resources, government initiatives and international partnerships can help overcome weaknesses such as inadequate infrastructure, poor governance and limited funding. Seizing opportunities such as technological advances, community engagement and sustainable practices can mitigate threats related to climate change, pollution and social disparities. On the basis of the results of the SWOT analysis, the following recommendations are proposed: Invest in infrastructure development: Allocate resources to modernize and develop the systems of water supply, treatment facilities, wastewater, and sanitation infrastructure to ensure access to water services and sanitation, reliable and safe; Improve governance and institutional capacity: Strengthen the regulatory framework, improving the transparency, accountability and efficiency of the delivery of services, and strengthen the capacity of institutions responsible for the management of water services and sanitation; to promote sustainable practices: Encourage water conservation, promoting the efficient use of water, the implementation of the initiatives, recycling and reuse, and the adoption of practices that are environmentally sound technologies to address environmental challenges and ensure the long-term sustainability; to empower local communities: Engaging in a dialogue with the communities, involving them in the decision-making processes, raise awareness of the importance of drinking water and sanitation, and to ensure equitable access to services for vulnerable populations; leveraging partnerships: Collaborate with international organizations, NGOS, private sector entities and other stakeholders to leverage resources, share knowledge and expertise and implement innovative solutions to meet the challenges of the water sector and sanitation.

By implementing these recommendations in a coordinated and sustainable way, Cameroon can make significant progress towards achieving universal access to drinking water and sanitation, improving public health results, protecting the environment and promoting the socio-economic development of the country.

The water crisis in Cameroon has a significant impact on its neighboring countries, in particular:

- Increasing pressure on transboundary water resources: The populations of neighboring countries are turning to transboundary rivers and lakes to obtain drinking water and for irrigation purposes, which increases the pressure on these already limited resources. This can lead to conflicts between communities and countries over access to water, threatening regional stability.

- Degradation of the water quality of transboundary rivers: The pollution of rivers and lakes in Cameroon due to untreated wastewater and agricultural chemicals can flow to neighboring countries, affecting the quality of drinking water and aquatic ecosystems. This can have adverse consequences for human health, fisheries and agriculture in neighboring countries.

- Increased migration: People living in the regions of Cameroon most affected by the water crisis can migrate to neighboring countries in search of water and better living conditions. This can put a strain on the resources and services of neighboring countries, and lead to social tensions.

- Impact on the regional economy: The water crisis can slow down trade and investment in the region, as companies are struggling to find reliable and affordable water. It can also harm the development of tourism, which often depends on adequate access to water.

- Exacerbation of existing conflicts: The shortage of water can exacerbate existing conflicts between communities and countries for access to natural resources, which can lead to instability and violence.

The neighboring countries of Cameroon therefore have every interest in getting involved in solving the water crisis in this country. This can be done by: Supporting Cameroon's efforts to improve the management of its water resources, investing in transboundary water infrastructure, promoting cooperative and equitable transboundary water management, Strengthening the resilience of communities to the effects of climate change and rainfall variability. By working together, the basin countries can meet the challenge of the water crisis and ensure a sustainable future for all.

CONCLUSION

As part of this study on the water crisis in Cameroon, several important conclusions have been drawn. First of all, it was emphasized that the sustainable management of water resources is essential to guarantee equitable access to drinking water for all citizens. Challenges related to water supply in the country, such as pollution, overexploitation of resources and lack of adequate infrastructure, have been identified as contributing factors to the water crisis. In addition, it was highlighted that significant investments are needed to improve hydraulic infrastructure and ensure a reliable and sustainable water supply. Finally, it was emphasized the importance of raising public awareness of the importance of water conservation and promoting sustainable practices to guarantee access to drinking water for future generations. These conclusions underline the urgency of taking action to solve the water crisis in Cameroon and highlight the efforts needed to guarantee a sustainable future for all.

The water crisis in Africa, particularly in countries like Cameroon, is a pressing issue that requires immediate attention. Factors such as population growth, climate change, poor infrastructure, and lack of access to clean water sources have exacerbated the situation, leading to widespread water scarcity and inadequate sanitation facilities. This has significant implications for public health, education, and economic development in the region. To address this crisis, it is essential to implement sustainable water management practices that prioritize conservation, efficiency, and equitable access to water resources. Investing in infrastructure development, such as building water treatment plants, pipelines, and storage facilities, can help improve water quality and distribution systems. Additionally, promoting water conservation practices and raising awareness about the importance of preserving water resources can help mitigate the impact of water scarcity.

Collaboration between governments, non-governmental organizations, and local communities is crucial in finding long-term solutions to the water crisis. By working together to develop and implement comprehensive water management strategies, we can ensure a more secure and resilient water sector in Africa. Access to clean and safe water is a basic human right that is essential for the well-being of individuals and communities. By prioritizing sustainable water management practices and investing in infrastructure development, we can create a more sustainable future for Africa and safeguard the environment for future generations.

To answer the question about the effective implementation of sustainable water management practices in Cameroon, which is the main objective of our working topic, it is essential to emphasize the importance of a holistic and integrated approach. The water crisis in Cameroon cannot be solved only by ad hoc measures, but requires a long-term vision that takes into account environmental, social, economic and institutional aspects.

To ensure equitable access to safe drinking water for all citizens, it is crucial to actively involve stakeholders at all levels, including local authorities, civil society, the private sector and the communities themselves. Raising awareness and educating people about the importance of sustainable water management are also key elements to encourage responsible practices and efficient use of water resources.

The establishment of sound policies and regulations, supported by adequate investments in water infrastructure and appropriate technologies, is essential to ensure effective water management. It is also important to promote sustainable agricultural practices and rational management of water resources to prevent pollution and overexploitation of resources.

Finally, regional and international cooperation can play a crucial role in sharing knowledge, technologies and best practices in water management. By working together, local, national and international actors can contribute to meeting the challenges related to the water crisis in Cameroon and to ensuring equitable access to drinking water for all citizens.

Prospects for the future and recommendations for future actions

Investing in infrastructure is crucial for improving the water situation in Africa. Building and maintaining water treatment plants, pipelines, and storage facilities will help ensure that clean and safe water reaches communities in need. Governments, international organizations, and the private sector must collaborate to secure funding and implement these infrastructure projects efficiently. Additionally, promoting water conservation practices is essential to reduce water wastage and ensure sustainable use of limited water resources. Educating communities about the importance of water conservation and implementing water-saving technologies can make a significant impact in addressing the water crisis.

Enhancing water governance is another key aspect of improving the water situation in Africa. Strengthening governance structures, policies, and regulations can help ensure equitable access to water resources and promote efficient management practices. Transparency,

accountability, and stakeholder participation are critical elements of effective water governance. Moreover, supporting sustainable agriculture practices is essential for reducing the strain on water resources. Encouraging farmers to adopt irrigation systems, drought-resistant crops, and soil conservation techniques can improve agricultural productivity while conserving water.

Promoting cross-sectoral collaboration is also crucial for addressing the interconnected challenges of the water crisis. Collaboration between different sectors, such as water, agriculture, energy, and health, can lead to more holistic and sustainable solutions. Integrated approaches that consider the water-energy-food nexus can help optimize resource use and promote sustainable development. Empowering local communities to participate in decision-making processes and capacity-building initiatives is essential for ensuring sustainable water management practices at the grassroots level. By engaging communities in awareness-raising campaigns and providing them with the necessary tools and knowledge, they can take ownership of water management practices and contribute to long-term sustainability efforts.

Harnessing innovation and technology are another important aspect of improving the water situation in Africa. Leveraging innovative technologies such as remote sensing, data analytics, and smart water management systems can help optimize water use, monitor water quality, and improve decision-making processes in the water sector. By embracing technological advancements and innovative solutions, stakeholders can enhance efficiency and effectiveness in managing water resources. Overall, by implementing these recommendations and taking targeted actions, stakeholders can work towards a more sustainable and resilient water sector in Africa, ensuring access to clean and safe water for all.

Limitations of the study and avenues for further research

While the strategies proposed in the study offer valuable insights into improving water management in Africa, it is important to acknowledge the limitations that may impact the generalizability and effectiveness of these recommendations. Firstly, the diverse nature of African countries in terms of water availability, governance structures, socio-economic conditions, and cultural contexts may limit the universal applicability of the proposed strategies. Further research is needed to tailor solutions to specific regional and local circumstances to ensure their relevance and effectiveness. Additionally, data limitations, such as reliance on outdated or incomplete data, could affect the accuracy and reliability of the findings. Future research should prioritize collecting

up-to-date and comprehensive data on water resources, infrastructure, and governance frameworks in African countries to inform evidence-based decision-making.

To address these limitations and enhance our understanding of sustainable water management practices in Africa, further research could focus on conducting comparative analyses across different African countries or regions to identify best practices and success factors. Impact assessments of existing water management interventions can provide insights into their effectiveness and inform future policy decisions. Additionally, research on climate change adaptation strategies and technological innovations in water management can help mitigate the impacts of climate change on water resources and improve water monitoring, treatment, and distribution in African countries. By addressing these limitations and pursuing further research in key areas, stakeholders can advance sustainable water management practices in Africa and contribute to water security, environmental sustainability, and inclusive development on the continent.

BIBLIOGRAPHY

1. Action Against Hunger, (2006). Water-Sanitation-Hygiene for at-risk populations. Hermann, Paris, 785 p.
2. AFD, PS-WATER, (2006). The consideration of gender in drinking water supply projects in rural and semi-urban areas. Methodological Guide, 42 p.
3. Baechler L., (2017). Access to water. Major issue of sustainable development. 36 pp.
4. Bartram J., Corrales L., Davison A., Deere D., Drury D., Gordon B., Howard G., Reinhold A., Stevens M., (2009). Step-by-step risk management manual for drinking water dispensers. WHO, Geneva, 108 pp.
5. Concession contract for public works and heritage management of urban and suburban hydraulics for the benefit of CAMWATER 68 p.
6. Decree n ° 2018/144 of February 20, 2018 reorganizing the Cameroon Water Utilities Corporation.
7. Decree n ° 2001/216 of August 02, 2001 on the creation of a special trust account for the financing of sustainable development projects in the field of water and sanitation.
8. Decree n ° 2001/165 / PM of May 08, 2001 specifying the methods of protection of surface water and groundwater against pollution.
9. Djeuda Tchapnga H.B., Tanawa E., Ngnikam E., (2001). Water in Cameroon. Volume I: Drinking water supply. PUY, ENSP, 321
10. Fewtrell L., Bartram J., (2001). Water quality. Guidelines standards and health: Assessment of risk and risk management for water-related infectious disease. 432 p.
11. Fewtrell L., Colford J.M., (2004). Water, sanitation and hygiene: Interventions and diarrhea. A systematic review and meta-analysis, 88 p.
12. Fewtrell L., Prüss-Üstün A., Bos R., (2007). Water, sanitation and hygiene. Quantifying the health impact at national and local levels in countries with incomplete water supply and sanitation coverage. Environmental Burden of Disease Series, WHO, n° 15, 79 p.
13. Fotso J.-C., Kuate Defo B., et Mberu B. U. (Eds.). Urbanization, urban poverty and health in developing countries: A case study of urban poverty and health in the slums of Nairobi, Kenya. Springer Science & Business Media, 2011.
14. Hoedeman O., Kishimoto S., (2010). Water as a public good: an alternative to the privatization of water in the world. 319 p.

15. Mbatchou Ngahane B. H., Dzudie A., Menanga A., Kengne A. P., et Muna W. F. T. Renal dysfunction in patients with congestive heart failure in a sub-Saharan African country: a cross-sectional study. BMC Nephrology, 15(1), 40, 2014.
16. National Institute of Statistics of Cameroon (INS) and ICF International. Cameroon Demographic and Health Survey and Multiple Indicators 2018. Yaoundé, Cameroon, and Rockville, Maryland, USA: INS and ICF International, 2019.
17. Njoh A. J. The challenges of urban development in Cameroon. African Studies Quarterly, 10(4), 23-47, 2008.
18. United Nations Children's Fund (UNICEF) et World Health Organization (WHO). Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines. Genève: WHO, 2017.
19. Water.org - Water.org is an organization dedicated to providing access to safe water and sanitation in developing countries, including Cameroon.
20. World Bank. Cameroon - Water sector development project: environmental assessment: Environmental and social management framework (Vol. 2). Washington, DC: World Bank Group, 2017.

21. Law n ° 08/005 of April 14, 1998 on the water regime in Cameroon.
22. Law n ° 2018/022 of December 11, 2018 on the finance law of the Republic of Cameroon for the 2019 financial year.

23. www.unicef.org, accessed on July 6, 2014;
24. www.wateraid.org, accessed on July 11, 2014;
25. www.minee.cm, consulted on July 12, 2014;
26. www.wssinfo.org, accessed on July 16, 2014;
27. www.sanitation2008.org, accessed on August 8, 2014;
28. www.fondation-farm.org, accessed on July 4, 2014;
29. www.solutionsforwater.org, accessed on July 4, 2014;

APPENDIX

***Fig 1**: Evolution of percentage of households with access to safe drinking water in Cameroon during the MDG era. (Source : ECAM 1996, 2001)*

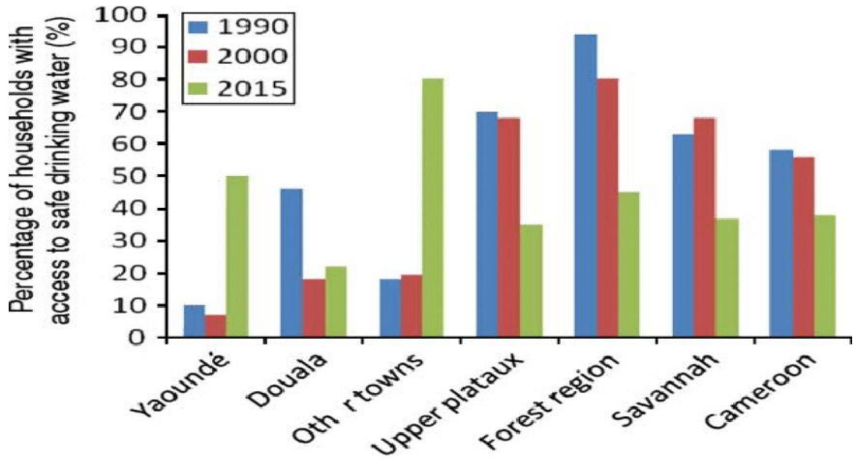

***Fig 2**: Water Scarcity and its Social Implications - Water scarcity: Water Scarcity in the Commons: A Tragic Tale*

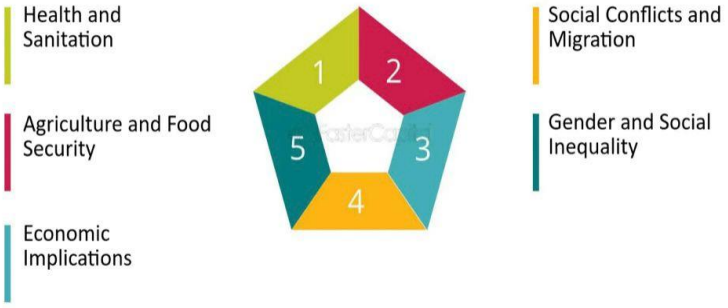

***Fig3**: Factors influencing respondents' satisfaction with the sanitation facilities*

	Unstandardized Coefficients		Standardized Coefficients		
Variables	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	.380	2.044		.186	.853
Water source distance from home	.314	.102	.177	3.077	.002
Water sufficiency for household members	1.840	.857	.122	2.147	.033
Frequency of water shortages	.461	.228	.123	2.019	.044
Estimated monthly household income	-.235	.091	-.168	-2.576	.011
Main source of livelihood income	-.282	.111	-.160	-2.541	.012
Problems with water supply	-.437	.544	-.045	-.802	.423