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Impact of the Implementation of the Kaleta Hydroelectric Power Station in the Context of Climate Change

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Abstract: ***The notion of climate change in the coastal zone has become in recent decades a strategic subject both globally and nationally. According to Z. Bamba and S. Cissé (2000) most scientists support the idea that climate change has a negative influence on natural resources, ecosystems, infrastructure and human health and may ultimately compromise the survival of the world humanity and life on our planet. Climate Change negatively influences natural resources, ecosystems, infrastructure and human. Health and may ultimately compromise the survival of humanity and life on our planet. This is why, like countries in the world, Guinea, by ratifying the United Nations Framework Convention on Climate Change (UNFCCC) in 1993, undertook to work for a policy of sustainable development, based on the rational use of natural resources and the improvement of production techniques. To fulfil its commitments, it drew up its firt national communication which established the vulnerability of the various resources to climate chance. This communication presented the green house gases emitt and absorbed in our country, listed mitigation measures and absorbed in our country, listed mitigation measures, identified resource vulnerabilities and determined global adaptation stratégies.***

Keywords: Greenhouse gases, climate change, variability, dry heat, humid heat

1. Introduction

The issue of climate change is always at the center of the concerns of scientists, the media, NGOs, and political decision-makers around the world. (PARKS, 2012).

They agree that climate change is a challenge that all sectors will face. It is a threat to biodiversity with its enormous consequences.

According to the IPCC (International Panel of Experts on Climate), out of 44,838 species, 16,928 are threatened with extinction leading to losses of 5% of species per decade.

These issues of climate change have for some time been at the center of concern for scientists and policy makers around the world.

Climate variability, the causes of which have yet to be identified, can manifest itself in long periods of drought with the consequences of negative effects on the hydrological cycle, the environment and socio-economic activities.

Global and local studies have been conducted by different authors. These have put in highlights the impacts of climate variability on water and ecosystems.

One of the major challenges of research on a complex phenomenon such as climate variability is to quantify its impact on the hydrological cycle and water resources.

In West Africa, a downward trend in rainfall was observed from the end of the 1960s and the beginning of the 1970s until the 1990s. [2], the same is true of the lower river flows, which leads to lower energy production. Also, increases in temperature contribute to evaporation phenomena in rivers, causing water shortages for agriculture, livestock, food, etc.

In Guinea, climate change could also have negative effects on agriculture, species composition and the productivity of marine ecosystems, which would ultimately have serious consequences for fisheries and downstream industries.

The dams, however, have involved the creation of huge reservoirs that occupy highly considered areas ((W, 2001).

As the Republic of Guinea belongs to the category of countries which are the means well served in electricity. Its energy situation is characterized by a low level of energy consumption per inhabitant (DNE, 1996), it is with this in mind that CERESCOR initiated research in the field of climate variability in the Dubréka area with the to determine its impact on climatic parameters. This could contribute to the understanding of this phenomenon.

This study takes into account aspects purely related to climate variability through the theme entitled:
"IMPACT OF THE IMPLEMENTATION OF THE KALETA HYDROELECTRIC POWER PLANT IN THE CONTEXT OF CLIMATE CHANGE"

2. Issues

For more than three decades, the climates of West and Central African countries have been affected by recurrent and severe drought. This phenomenon has resulted in significant rainfall and hydrometric deficits, the consequences of which have been devastating for the sub-region because of their immediate and lasting repercussions on the natural environment and on man.

The Guinean coastal zone with the consequent rise in sea level due to global warming could lead to an increase in flood sequences and coastal erosion, an increase in the frequency and high severity of tropical storms, a modification of distribution and abundance of biological resources in the coastal zone (M.L KEITA).

The decrease in rainfall and the rise in water temperature result in the intensification of evaporation, the increase in salinity and the increase in the concentration of water vapor in the atmosphere.; which will result in the modification of the faunal and floristic composition with a decrease in biological productivity.

The objective of this study is to capitalize, using innovative and adapted methodologies, the information necessary for the analysis of the impacts of Climate Change in the area where Kaléta is located, to analyze the evolution of the parameters climatic conditions (temperature, rainfall, etc.) and the establishment of structuring programs that would help local populations to adapt to new natural situations.

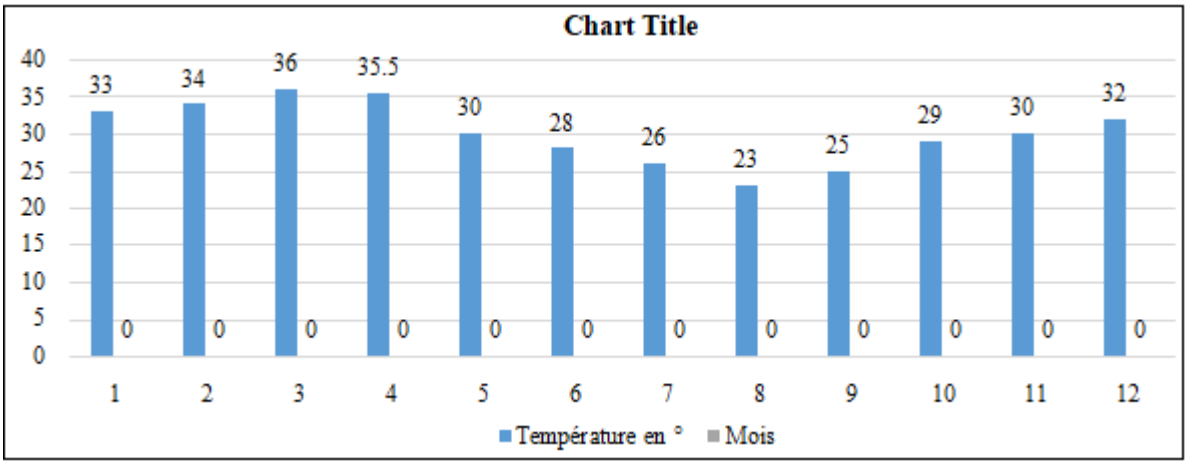

Figure 3.1: Monthly average temperature curve

From the figure, we see that the temperature is equal to 36°C (March) and 23°C (August).

Maximum monthly averages are generally observed during the months of March and April.

Absolute maximum temperatures are highest between February and April (34 to 35.5°C) and lowest in August and September (23 to 25°C).

The daily thermal difference is very significant during the harmattan period (32 to 36°C from December to March) and decreases significantly with the arrival of the monsoon (23 to 25°C in August-September).

III-2: Annual Temperature Variation

The annual average values for the 30-year period (1983-2013) are shown in Figure 3-2: below:

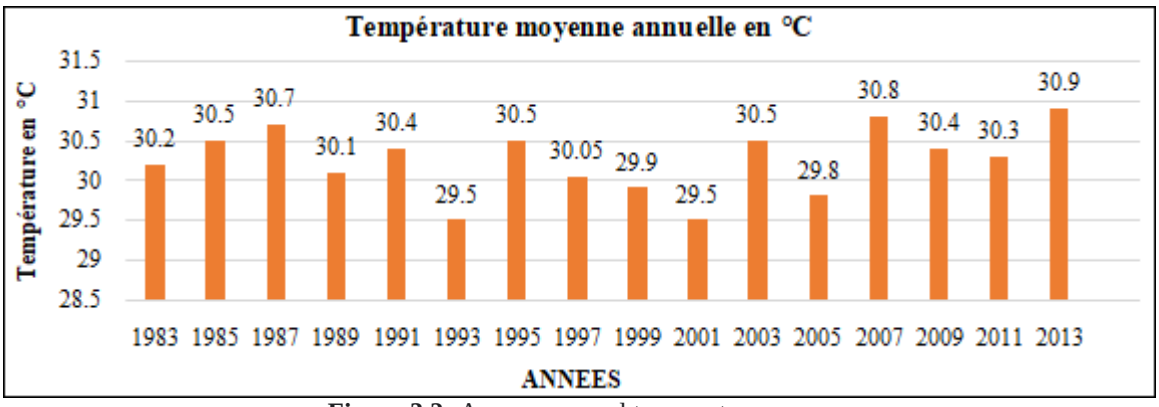

Figure 3.2: Average annual temperature curve

According to Figure 3.2, it can be seen that the annual average temperatures in the area of the Kaléta dam vary between 29.5°C (1993 and 2001) and 30.9°C in 2013 (This maximum temperature was 30, 7°C in 1987 and 30.8°C in 2007). Inter-annual variations show a remarkable peak in 1987, 2007 and 2013.

III. 3: Variation in air humidity

The relative humidity of the air is expressed as a percentage and is defined as the ratio of the quantity of water actually contained in the air and the absorption capacity at a given temperature.

The relative humidity of the air is always high at 6 am (90-97%), even in the dry season, due to the sharp drop in temperature during the night. At noon, the humidity drops to

a value between 45 and 65% in the dry season but remains around 70 to 80% in the rainy season. At 6 p.m., it rises to around 65 to 70% during the dry months and to 85 or 90% during the winter.

When the temperature increases during the day, the relative humidity decreases while the water content of the air mass remains unchanged.

III. 3-1: Monthly average humidity

The monthly average relative humidity from January to December is shown in the following figure.

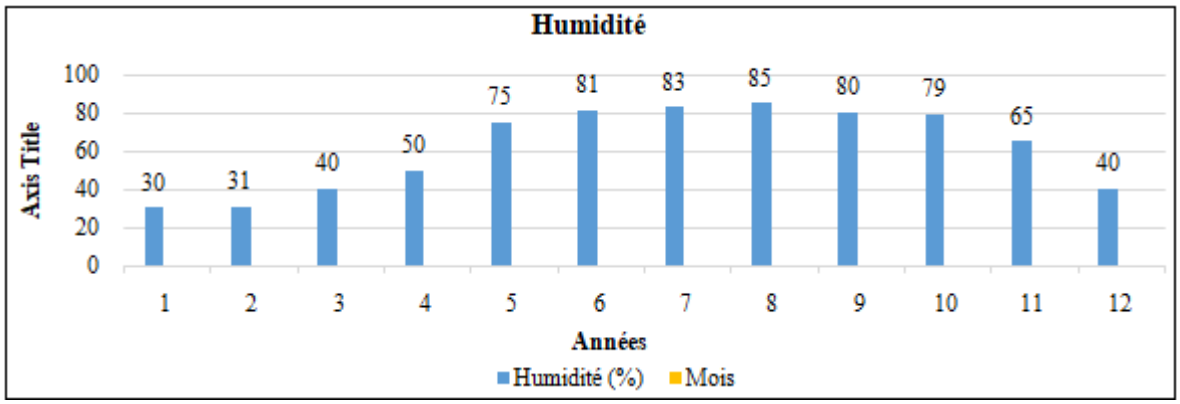

Figure: Monthly average humidity

According to Figure 3.1, we see that the monthly average relative humidity varies between 30% (January) and 85% (August). However, it should be noted that the month of February also has low humidity (31%). The month of July, in turn, has humidity as high as the month of August (83%).

III. 3-2: Annual average humidity

The average relative humidities for the period (1983-2013) at the Kaléta dam are represented as follows:

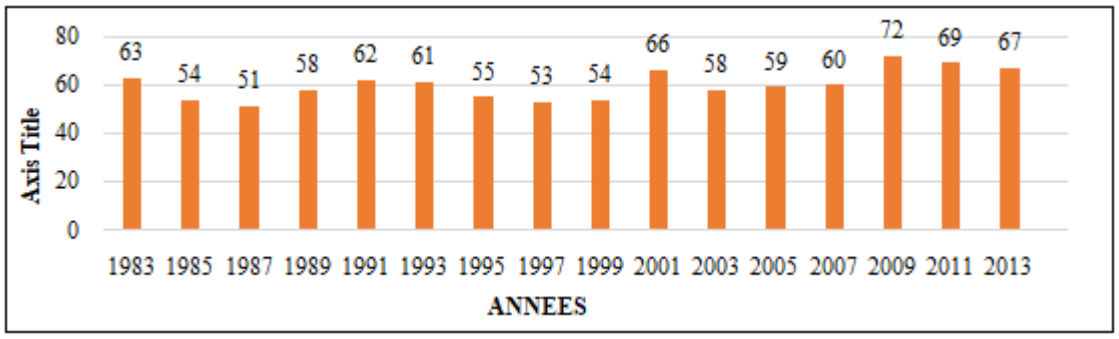

Figure: Annual average humidity

According to Figure 3.2, we see that the annual average relative humidity at the level of
Kaléta dam varies in sawtooth. It has a minimum value equal to 51% (1987) and a maximum value 72% (2009).

III. 4: Rainfall

III-4-1: Average monthly rainfall

The variation in average monthly rainfall from January to December is shown in the following figure.

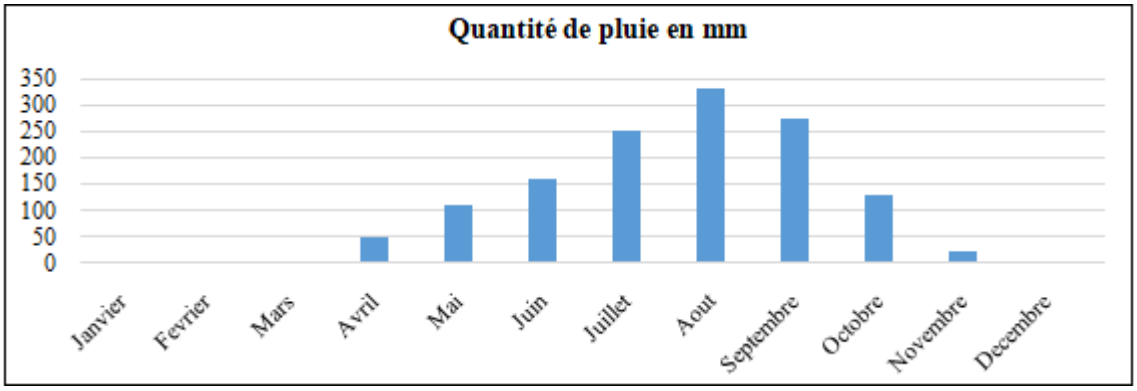

Figure: Average monthly rainfall

According to Figure III-4-1, we see that the average monthly rainfall, close to 0 in December and January, reaches the maximum in August (330 mm).

III.4.2: Average annual rainfall

The variation in average annual rainfall for the period 1983-2013 at the Kaléta dam is shown in the following figure.

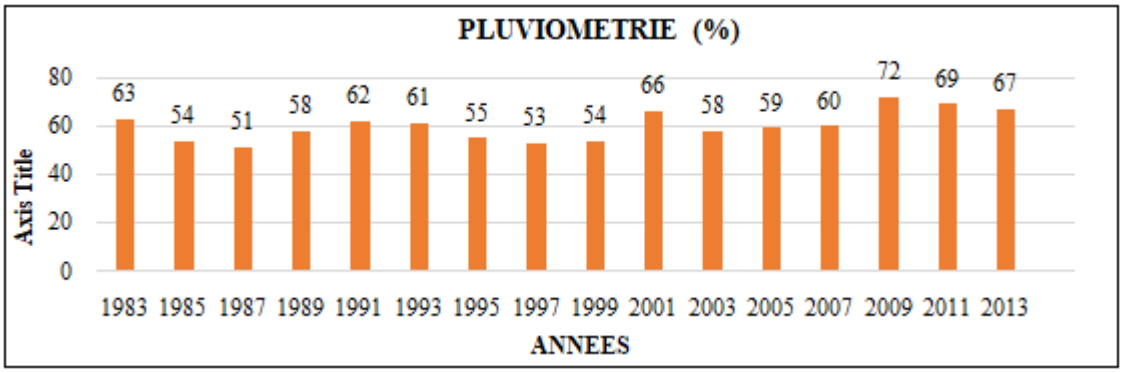

Figure: Average Annual Rainfall

According to Figure 4.2, we see that the average annual rainfall at the Kaléta dam varies in sawtooth patterns. It has a minimum value in 1987 (51%) and a maximum value in 2009 (72%).

3. Discussion

During these last years after the analysis, it should be noted that:

The climate risks to which the populations, infrastructures and ecosystems of the Dubréka prefecture and its direct zone of influence are exposed are characterized by 2040 with a view to allowing all stakeholders to understand the impacts of climate change.

Individual and collective awareness of adaptation needs emerges from foresight exercises including climate risk scenarios constructed collectively and makes it possible to integrate these issues into territorial planning documents.

Awareness-raising and training actions for public authorities responsible for regional planning in the Dubréka prefecture are being implemented.

Civil society awareness-raising actions are implemented through an environmental education and eco-citizenship program focusing on information, awareness-raising and training seminars and conferences.

Pilot adaptation actions relating in particular to the reduction of the risks of flooding, water deficit and heat islands are implemented by all the stakeholders concerned with a view to significantly improving the environment and quality of life of the populations. of this prefecture and its direct zone of influence.

NB

The latest IPCC report (2007) indicates that the increase in average temperature between 2080 and 2099 compared to the period 1980-1999 could reach 3 and 6°C over the entire African continent, i.e. 1.5 times more than at the World level.

4. Conclusion

In view of the above, the observation is that the impact of climate change is felt and is becoming a reality in Dubréka at the level of the Konkourériver which houses the Kaléta dam. This observed climatic change observed in the dam area is generally induced by anthropogenic factors, that is to say human activities which include, among others: deforestation, excessive cutting of wood, etc.

On the annual graphs, we can clearly see that from 1983 to 2013, the climatic trend was more or less above the climatic normal. On the other hand, since after the dam (2015), we have noticed that climate change is becoming more and more recurrent.

Ultimately, this article demonstrates that activities require better governance in order to better manage the challenges of global warming they face. However, better governance would not only be limited to the creation of adequate policies or binding laws with appropriate sanctions in the event of misconduct or negligence, but would also require the commitment of States, law enforcement agencies, civil society, local communities and other categories of actors including international institutions.

It is plausible that in-depth research would surely have provided alternative answers to what has been presented in the present work.

A minimum of knowledge of the field would perhaps have made it possible to look for other angles than those presented by the documentation examined and could have facilitated the in-depth study of this report.

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