

Causes Of Drought In Baraka's City And Its Impact On The Health Of The population

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Abstract – Droughts claim more victims and cause more displacement of populations than cyclones, floods and earthquakes combined. These natural disasters, less spectacular, are however less publicized. The lack of water, especially potable water and the overflow of water due to flooding create diseases that attack the population. In its June 2008 report, the WHO estimated that dirty water is the cause of 9.1% of illnesses and 6% of deaths recorded each year worldwide. Children are the first victims, since water is the cause of 22% of diseases in the children under 14 years old.

Since the 1970s, the areas affected by drought have doubled and it is often women, children and the elderly who pay the heaviest price. To date, 168 countries (out of 197) claim to be affected by desertification due to the process of soil deterioration in arid regions which affects food production and is exacerbated by drought. The study of the drought of tropical Africa did not begin to be studied until 1972. But, for the Democratic Republic of Congo, this subject is almost forgotten due to its gleaming rainfall situation. Unfortunately, this is in the process of decreasing and is observed in certain regions; this is the case of the Mutambala sector, Fizi territory, South Kivu province.

Keywords – Drought, Disaster, Disease, Environment, Population.

I. INTRODUCTION

The clean environment promotes the development of humanity. Its disturbance creates an imbalance in the whole ecosystem and it is the biosphere which is most affected and even more, man is the most vulnerable.

II. PROBLEMATIC

The Mutambala sector is located in the territory of Fizi in the province of South Kivu. It has an area of 776 km². The city of Baraka (which is the capital of the sector) has an enormous demographic, i.e. approximately 215,289 inhabitants living on an area of 25 km² with a density of around 8612 hab/ha.

In the Mutambala area, agriculture is one of the important activities of the economy, apart from trade and fishing. Production is generally based on cassava, oil palms, rice, maize, beans, bananas, tomatoes, yams, peanuts, sweet potatoes, sugar cane, ... to do this, agriculture is the most important local economic activity. Unfortunately, the result of this activity has been declining in recent years given the problem of drought caused by a too sunny climate and the gradual disappearance of rivers.

With this mind, we asked ourselves the following questions :

- What is the source of this sunshine ?
- What is its impact on the environment and the health of the population ?All these questions will be answered in the following lines.

III. METHODOLOGY

To achieve this work, the following methods were applied:

- Field observation ;
- Interview of the various local personalities, medical, internationalorganization and agents of the ministry for the environment ;
- Consultation of the Baraka health zone report sheets ;
- Biography.

IV. MATERIALS

The realization of this work required us to use the following materials:

- A field notebook
- Pen
- A computer
- An itel1408 Android phone device used as a camera.

Drought has a lot of definition depending on the field. Actu-environnement.comdefines drought as a long period of time during which the amounts of precipitation are below statistics in a region.

According to the damage that drought brings to the environnement and to thepopulaton, climatologists have subdivise it into 3 categories, namely : meteorological,agricultural and hydrological drought.

- The meteorological drought

This corresponds to a prolonged deficit of precipitation for periods ranging from a few months to several years, or even decades.

This is why the period of precipitation, which should last approximately six to seven months per year and with abundand rains, experiences sequences of mini dry seasonwhich begin to take place in the Mutambala sector (between January, february and sometimes part of March). This phenomenon occurs because of the mismanagement of forest estates (here the case of the Bingünté and Mabondo forests) of the Republic.

- Agronomic or agroecological drought

It is characterized by a water deficit in the soil and the development of vegetation. Agroecological drought is signaled when the quantities of water evaporated by plantsexceed the rainfall inputs. The drought of the soil is observed in Baraka by the burning of the leaves causing the wilting of the plants with as consequence, the reduction of the fields production.

- Hydrological drought

Water drought occurs when watercourses (lakes or rivers) show an abnormally low flow level and a decrease in water tables (groundwater) in this area. The lack of water accompanied by high temperatures accentuates the phenomenon of drought, because there is more evaporation and transpiration of plants (evapotranspiration) which dries up the soil. In this context, the temperature which varies between 25°C and 32°C (www.health.com) promotes the evapotranspiration of plants given the lack

of precipitation, plants and trees dry out.

According to the observation made in the city of Baraka, almost all the rivers Malala, Achwalongo, ma`ù and Mwemezi also called Mkemakye disappear during the dry season and the vertiginous drop in the water table which caused the abandonment water boreholes carried out in the city and its surroundings. In Baraka for example, out of 22 boreholes drilled by Tearfund, only 6 are operational and they are on the shores of Lake Tanganyika.

Based on this definition and knowing the period of precipitation in the tropical zone and in particular in the East of the Republic which probably begins in September until April, the observation in this region during our stay (from January 2017 to August 2018) presents a rainfall imbalance, that is why we were interested in knowing the causes, types and adequate solutions to bring to this scourge. A question now deserves to be asked : what is the source of the drought in the Mutambala sector ? the answer to this question is found in the results obtained in the following lines.

V. RESULTS

By talking to Mr. EKYOCI EBUNGA, the environmental officer in the Mutambala sector, he revealed to us that the source of this climate change by excessive sunshine is due to deforestation which has made two large forests disappear. Forests that surrounded the city of Baraka and which extended to the locality of Mukera. Its forests were called Bingùté and Mabondo. This destruction was caused by the cutting of trees for the manufacture of umbers, planks and artisanal gold mining.





Photos of the disappearance of the open forests that surrounded the town of Baraka.(photo taken 03/08/2018).

The disappearance of these forests also creates an imbalance on fields activities and gardens, this is the case of the yellowing of the leaves on almost all the trees and fruit plants found in the city and in the fields. The illustration is that of Maman Monique's cassava field that we visited and photographed. The following images show how the lack of water creates on plants and fields (images 1 and 2).



Papaya drought in Majengo's district, avenue Louise Munga N°48, in Baraka town.



The yellowing of cassava leaves due to the dry soil in mama Monique's field.

This phenomenon also affects some of this area, such as the temporary disappearance of the Malala River. The following photos illustrate these two rivers in a phase of drought.



The photo of the Mwemezi river in July 2017.

The acceleration of the drought causes humans and animals to share the same remnants of river water. The water tables also decrease which makes abandon the water wells drilled in the city. The following photo illustrates this experience.



Photo A : the goat collecting water on the bed of the Malala river and photo B : the man and the goat using the remaining of water on the bed of the Mwemezi river.

(photo taken in August 2018).



Photo A : the abandoned borehole and photo B : the well in the operation in the Mwemezi district.

We also visited the tanks for receiving water drawn and distributed without going through treatment.



Photos of the dryness of the soil with the gradual disappearance of trees around the tanks. (photo taken by Ir. Stanislas Maneno at the Baraka water distribution tanks in August 2018).

The dryness of the soil is also manifested by the cracks that are created in the walls of the house in the Majengo district, which collapsed due to excess cracks. The consequence of drought is sometimes the surprise appearance of torrential rains creating floods in neighborhoods. This is the case of the AEBAZ district which is found under water.



Photo A : a house collapsed in the Majengo district by torrential rain in June 2018 andphoto B : a flooded plot in the AEBAZ district in June 2018.

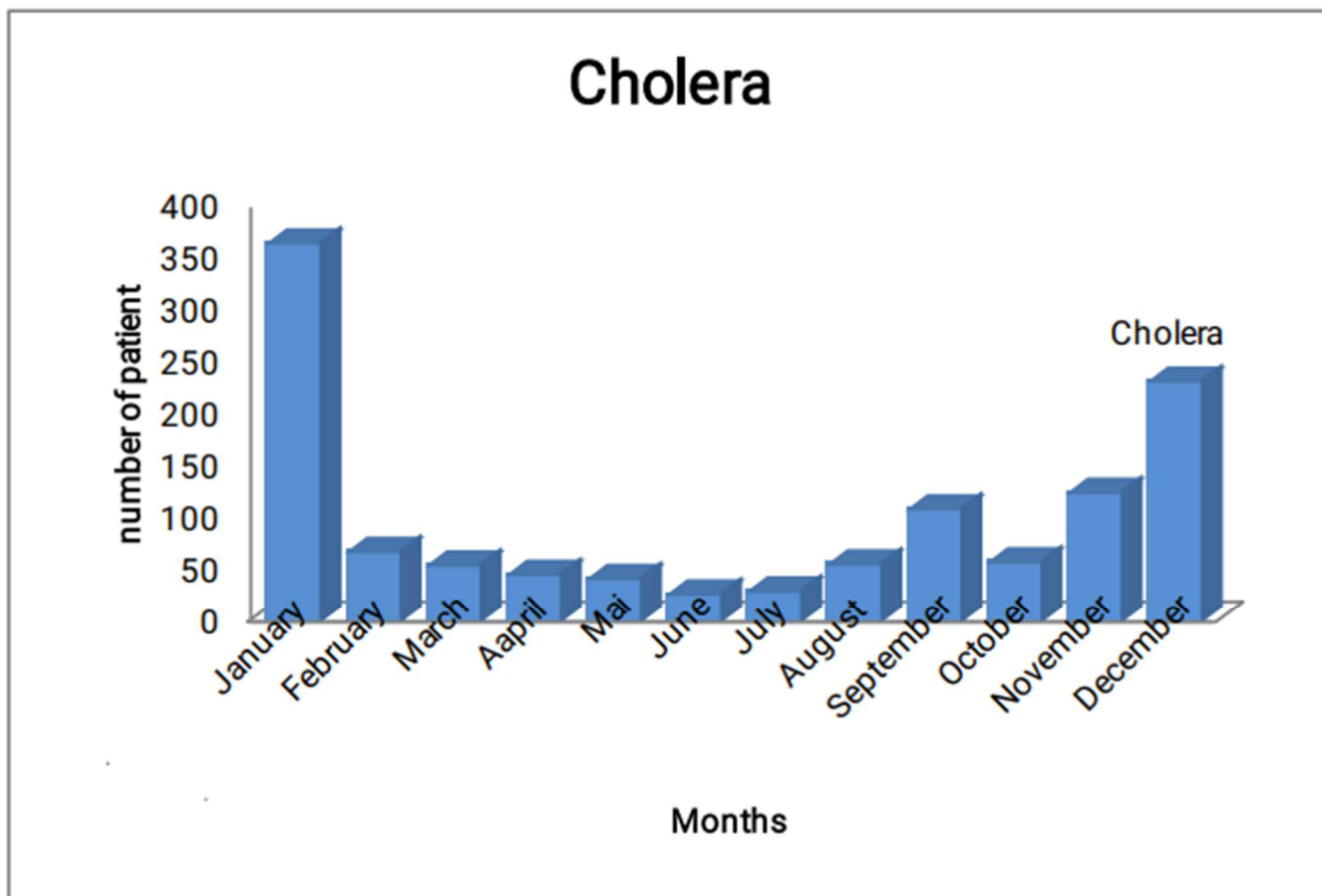
Drought not only degrades the environment, but also the people. This is why we consulted the technical sheets for the consultation of patients sufferingfrom water- borne pathologies in the Baraka health zone.

For the year 2016 alone, the water-born diseases that attacked the population area :

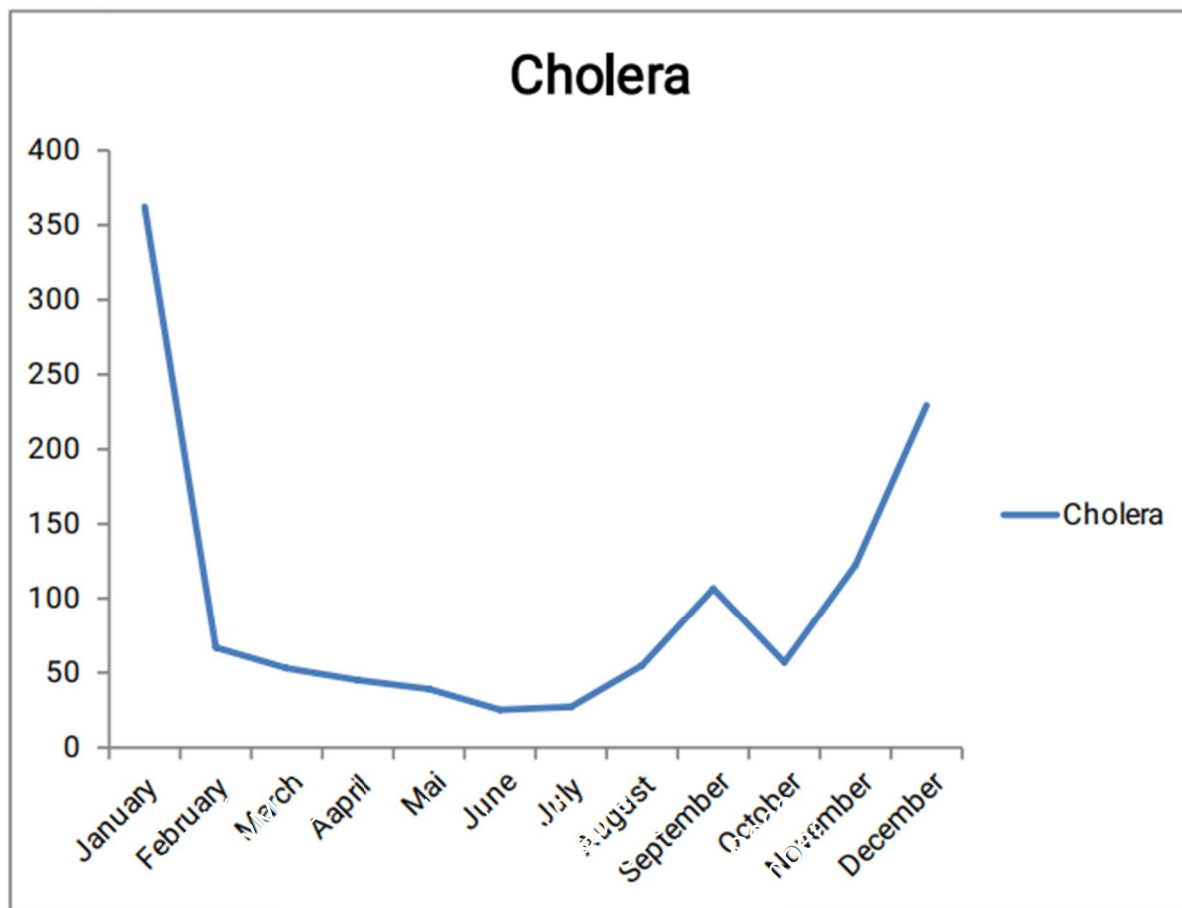
Month	Bloody diarrhea	Simple diarrhea	Cholera	Typhoid fever	Monthlytotal
January	97	841	362	36	1336
February	86	1218	65	52	1421
March	82	572	52	53	759
April	93	633	43	39	808
May	127	412	39	57	635
June	112	710	24	55	901
July	79	1147	27	61	1314
August	76	782	53	40	951
September	107	1682	106	34	1929
October	83	1271	55	41	1450
November	66	544	122	85	817
December	69	1007	229	84	1389
Annual total	1077	10819	1177	637	13710

By representing each case on the graph, we will see how each disease varies during the year.

Graphic representation of the cholera morbidity rate during the year 2016.

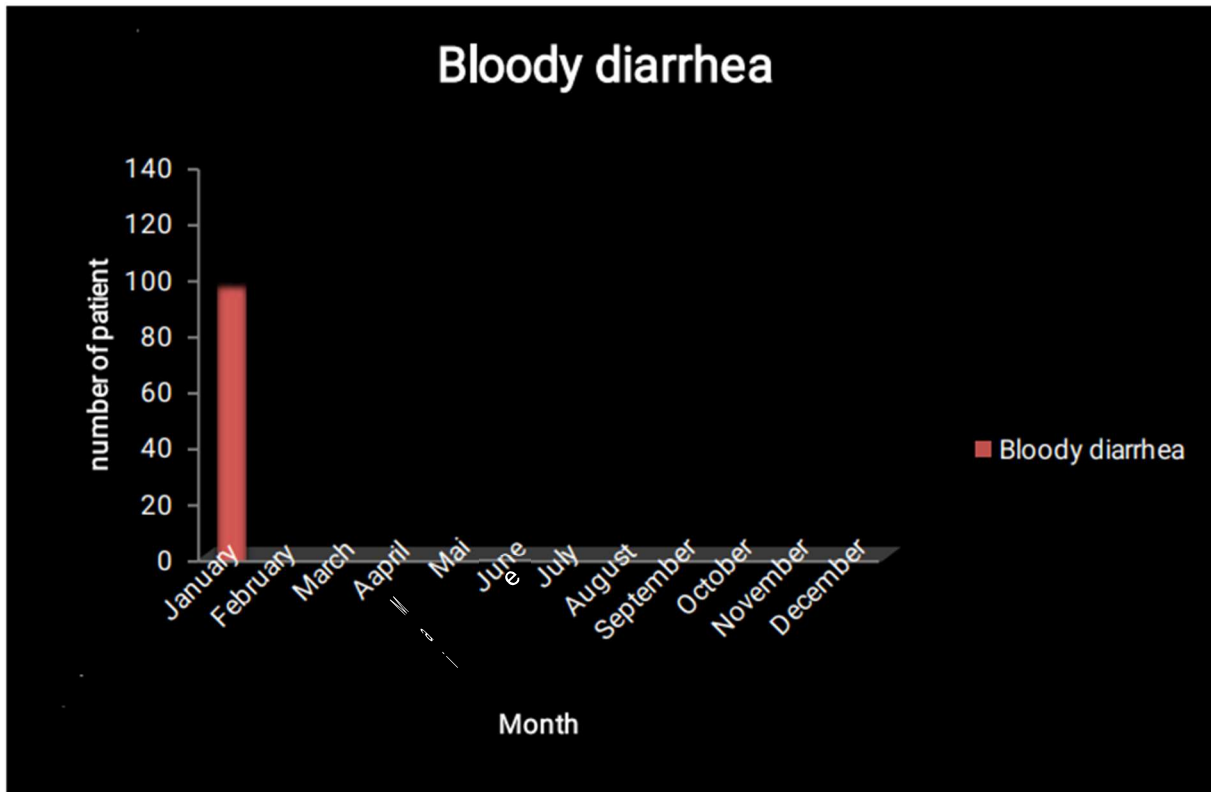


Histogram of cholera patient in 2016

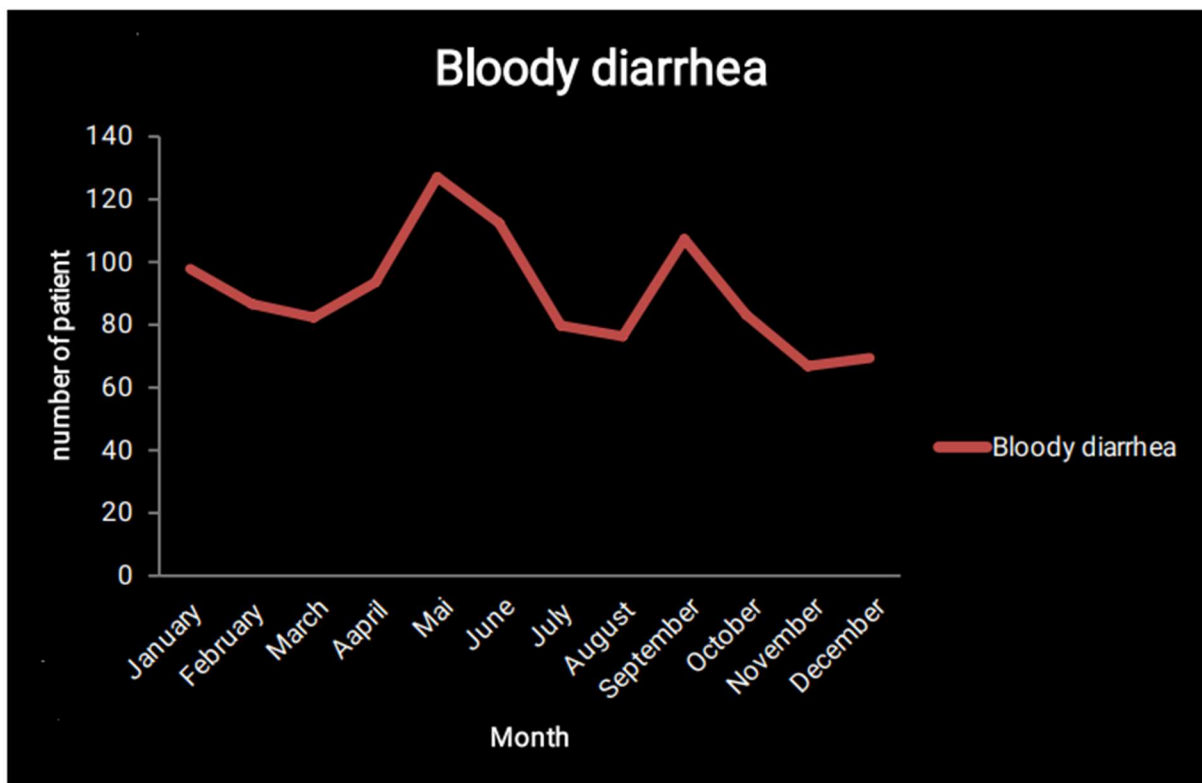


Annual change in cholera in 2016

Graphique representation of the morbidity rate of bloody diarrhea during the year 2016.

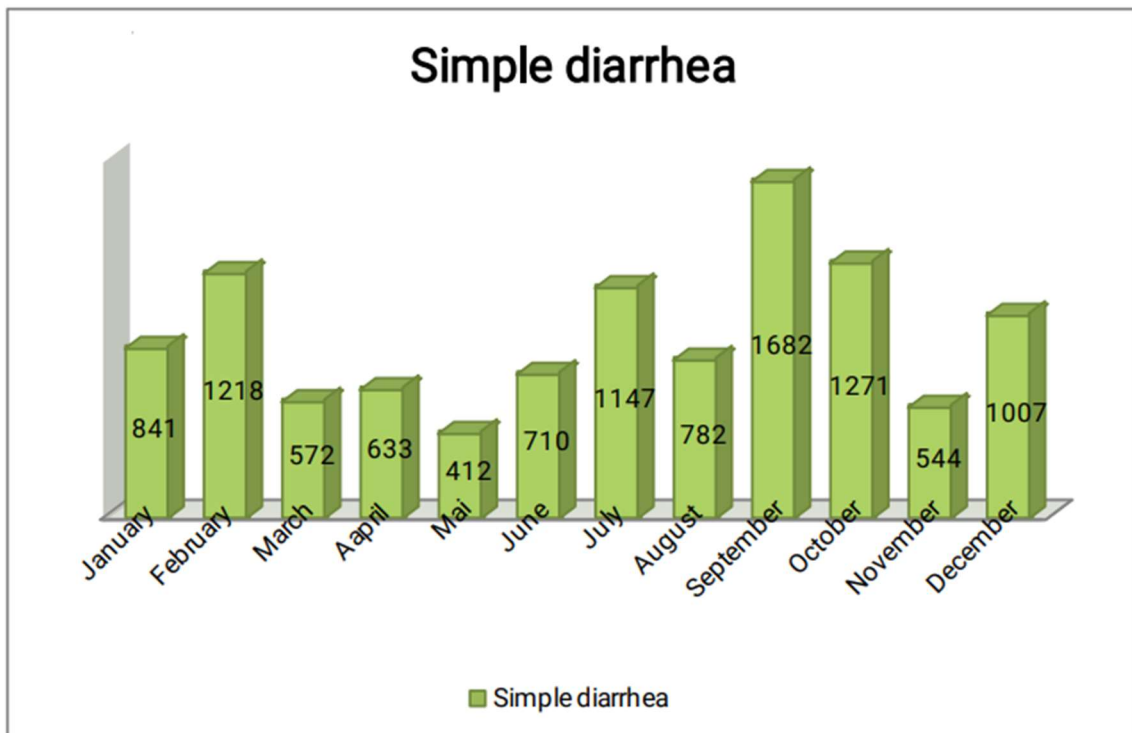


Histogram of patients with bloody diarrhea

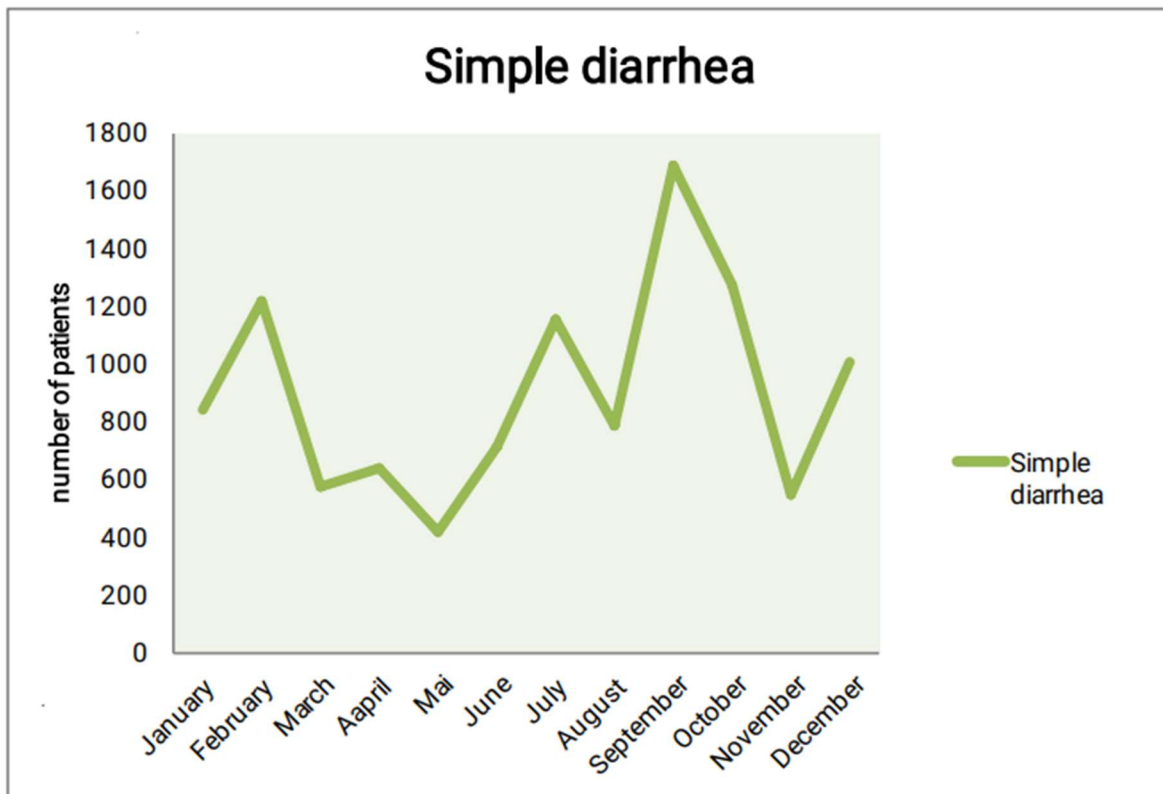


Annual change in bloody diarrhea in 2016.

Graphical representation of the morbidity rate of uncomplicated diarrhea during the2016

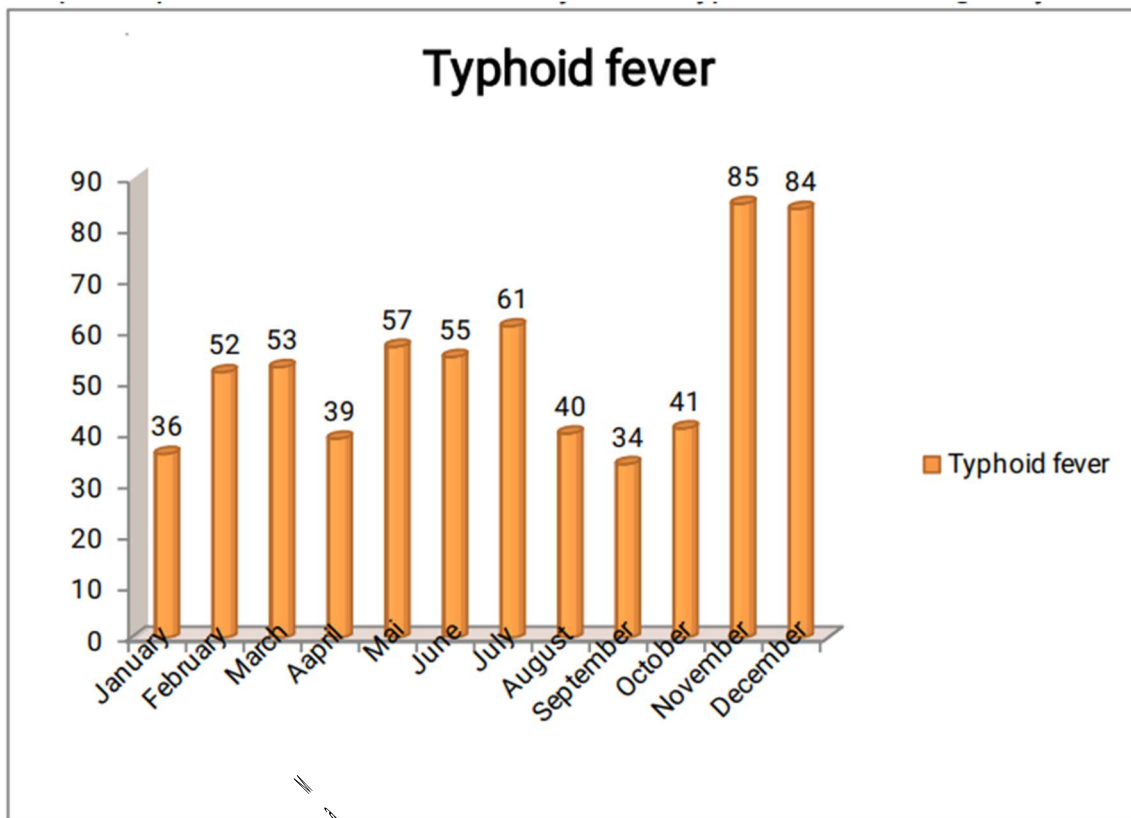


Histogram of patients with simple diarrhea.

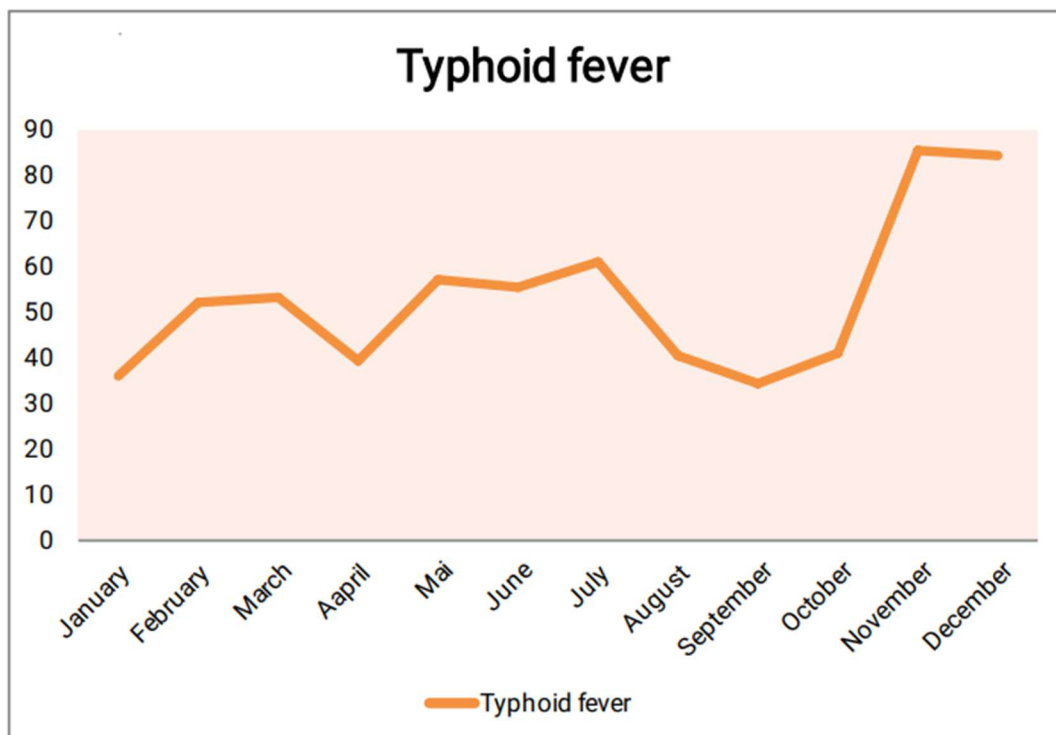


Annual change in simple diarrhea in 2016.

Graphic representation of the morbidity rate of typhoid fever during the year 2016.

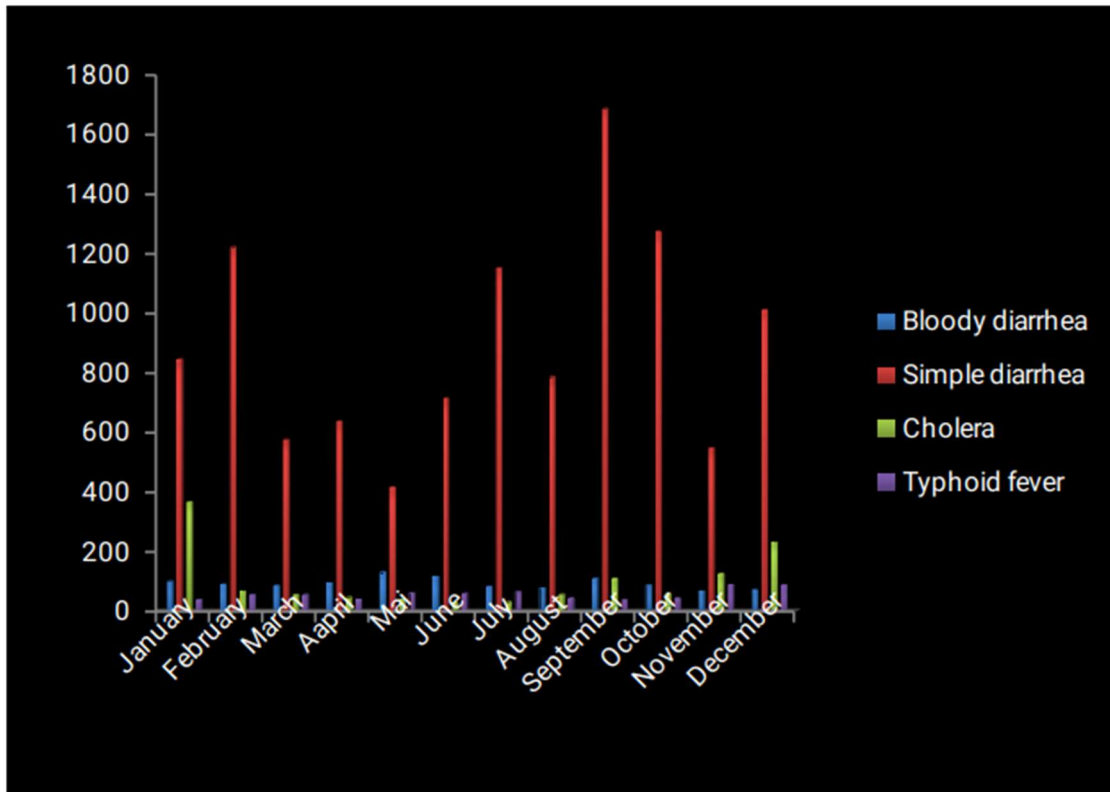


Histogram of patients with typhoid fever.



Annual change in typhoid fever.

Composite graphic of the morbidity’s patients with water-borne dise



VI. DISCUSSION OF RESULTS

The city of Baraka is regularly affected by drought due to its geographical position which gives it a hot and dry climate. This alternation of climates accelerates drought and creates significant consequences for the ecosystem.

By analyzing the data presented above, we see that the population of this city suffers from water-borne diseases due to the lack of drinking water. And then we see that it is simple diarrhea which predominates the remains of pathologies, followed by typhoid fever which often overlaps with cholera. Bloody diarrhea is at the bottom of the picture.

According to the statistical evaluation suffering from water-related diseases, including :

- 1077 or 7% of patients had bloody diarrhea ;
- 10,819 or 79% of cases affected by simple diarrhea ;
- 1177 or 8% of patients suffered from cholera ;
- 637 or 6% of people were bedridden with typhoid fever.

Then looking at the following table, we see that the months in which the population is more affected by a disease are the months in which other diseases attack the least. As regards cholera, the latter increases in September with 106 people until reaching a peak in January when the number reaches 362 patients ; from February to August, the number of patients decreases to reach 24 people in June.

By analyzing the morbidity rate of bloody diarrhea, we find that the population is a victim of this scourge throughout the

year. The number varies between 69 and 127 patients. The highest peak is observed in May and the lowest peak in December. Out of 1077 cases registered, a monthly average is 163.33 cases received. Still without the same, the health zone of BARAKA recorded 1177 cases of cholera with the average of 181,077 cases per month.

Compared to previous diseases, the population of Baraka health zone was more attacked by simple diarrhea. We recorded a total of 10,819 cases, averaging 1,664.46 cases each month. The annual distribution is as follows : the disease made it possible to find 4 curves :

- The first of which goes from January to May with the highest peak in February with a total of 1218 patients and the low peak recorded in May with 412 cases ;
- The second wave goes from May to August with the peak which is fixed in July, the month of May keeps the lowest peak ;
- The third curve begins in August until September with 1682 cases. Moreover, this is the highest peak recorded during the year and the lowest peak is observed in November ;
- And finally, the half-curve takes the last two months of November with 544 cases and December with 1007 patients.

Unlike simple diarrhea, the Barakois population recorded 637 cases of typhoid fever with the average of 98 cases each month. The morbidity rate fluctuates between 36 and 60 cases. But a sharp rise was observed in November 84 cases.

VII. On wildlife

Likewise for the human population, a lack of water also affects fish, which creates their scarcity in Baraka, a town that was once qualified as branded fish for the province of South Kivu, but it is beginning to suffer from their deficiency and their small quantities fished there are enormously expensive.

The situation is worsening for this aquatic population because the places planned for their reproduction is being invaded by the sands carried by the rivers which flow into Lake Tanganyika. The most dramatic case is the turbidity of the Mutambala river which once crossed the two forests devastated by deforestation and artisanal gold mining. The latter captures significant quantities of sand during its journey.

The lack of forests eliminates the animals species that flooded them, the of mountain gorillas. The lack of water to water domestic animals creates conflicts between the population and the animals due to the common use of the quantities of water remaining on river beds in the midst of drought.

During the years 2016 and 2018, more than 300 homes were collapsed by torrential rains accompanied by the strong winds and many others were inundated by the abundant inflows of runoff which overflowed Lake Tanganyika.

The drying out of the ground also attacks the houses because there are cracks in many houses in the city.

VIII. Conclusion

After having analyzed the types of drought that attack the Eastern part of the Democratic Republic of Congo and its consequences on the environment and on the population, we propose solutions at three levels in the short term for urgent cases and in the medium term for cases relatively serious. A possible solution in the short term is the reforestation of the hills and mountains above the city and on the banks of the rivers which are more attacked by the drought, then the prohibition to continue cutting down the rest of trees. A medium-term response is to address the energy problem. On this, it is advisable to activate research at the level of the Great Lakes region, to achieve the optimal exploitation of methane gas which can be used for the transformation of electric current to supply towns and villages and also to charge this gas in the cylinders so to be used in the gas stove, as this use of gas in cooking will greatly reduce the use of wood and embers as a source of energy.

Regarding drinking water, it is good to use the Abela method which concerns the development of the water sources which are on the middle plateau overlooking the city by connecting it to the tanks already built, the latter will only have the job of collecting the water from the different catchments and distribute them to the taps already available in the city. This system will stop the epidemics that plague the city of Baraka and its surroundings. Another solution is to install a complete

REGIDESO water treatment station.

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