



THE IMPACT OF AIR POLLUTION ON THE HEALTH OF INHABITANTS IN THE CITY OF DOUALA: CAMEROON.

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INVENTORY

- Nowadays, it is obvious to everyone that the first victim of the poor quality of the air is the **HUMAN HEALTH** before the **ENVIRONMENT**. In **AFRICA**, more than 70% **URBAN SUB-SAHARA INHABITANTS**, are victims of the **WORSE AIR QUALITY**. **World Bank and WHO** established that with 5.5 million death in this geographic area, air pollution kills more than HIV AIDS and Malaria. Let understanding clearly that, Africa is the main victim of this drama and pays the heaviest tribute (World Bank report, 2016 [4]).
- In the case of the city of Douala with its 4 million inhabitants, the culprits of this air pollution are :
 - The rapid **POPULATION GROWTH** with an **ANARCHIC URBANIZATION**;
 - **OLD CARS** (vehicles, buses, trucks, etc..) purchased in second hand (with 80% that are more than 10 years old) to which we can add at least 300 000 **MOTORBIKES**;
 - The non **ASPHALT ROADS** which inject a lot of dust (PM_1 ; $PM_{2,5}$; PM_{10});
 - The **FUEL STATION** that sell oil with some natural constituents cruded as lead, higher sulfur diesel and, **GASOLINE** with its additives.
 - The **WOOD/COAL FIRE** use to cook and sell common food along the road side.



I- PREVIOUS RESEARCHES APPROACH

- 1) Before the **ASSESSMENT** of the **IMPACT** of air pollution on the health, we first measured the concentration of some pollutants in the city of Douala :
 - PARTICLE MATTERS** (PM₁₀ and PM_{2.5})
 - MOLECULES** such as: O₂, NO_x, NO₂ and NH₃.
- 2) These measurements were conducted at two **main crossroad roads** in Douala (Ndokoti and Deïdo), at the **electrical thermal plant** (Logbaba) and during a **tour around the city** using motorbike.

These two data collection approaches allowed us to have an overview through the dispersion in space and time of the polluted air at Douala.



FIGURE 4: DUSTTACK 8520 (PM₁₀ and PM_{2.5})

I.1- MATERIALS USED

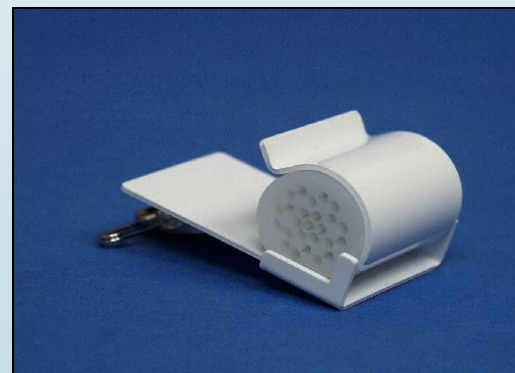


FIGURE 5: OGAWA PASSIVE SAMPLE OPS



After analyzing the data collected during our campaign, it appears that the city of Douala is actually polluted by particulate matter. As anyone can notice on these results:

A- IN SPACE:

Average value found for **PM_{2.5} : 183,43µg/m³** that is **7 times** higher than threshold set by WHO

B- IN TIME

1- For **PM₁₀** the average found value : **256,42 µg/m³** that is **5 times** higher than the threshold set by WH

2- For **PM_{2.5}** the average found value: **50.78 µg/m³** that is **2 times** higher than the threshold set by WHO



II- METHODOLOGY ADOPTED TO STUDY THE AIR POLLUTION IMPACT

To **assess** the impact of the **air pollution** on the inhabitants of the city of Douala, we proposed a **questionnaire** that was supposed to make it possible to establish **a correlation** between the **clinical manifestations** felt by the interviewees and the pollutants to which they would have been **subjected**

II.1- QUESTIONNAIRE

The questionnaire was **administred** through about 20 to 25 minutes **discussion** and structured around **03 components**:

- The first component intended to **identify** the interviewee and its characteristics such as **gender**, **age** and **school level**.
- The second one was **clinical manifestations** they experienced and which can be **related** to the air pollution.
- And the last one intended to record different **risk factors** and the **exposure duration of interviewees**;

II.2- MAIN EXPOSURE PERSONS

To conduct the surveys through this interview, we decided to select the most exposure persons dealing with these activities:

- Motorbike Riders (**MBR**)
- Outdoor Workers (**ODW**);
- Indoor Workers (**IDW**)
- Fuel Station Sellers (**FSS**).



III.3.2- Confound symptoms

Age, **Alcohol** and **Cigarette** are the three other **characters** that could influence the outcome of the impact of air pollution on health and create confusion. For this, we used once more the **Pearson's Exact Independence Test**. The table 2 below shows the confusion result linked to Age.

| Age Range | Cold | | Pungent Nostril | | Throat Pain | | Fever | | Sinusite | |
|-----------|----------|-------------|-----------------|-------------|-------------|-------------|----------|-------------|----------|-------------|
| | χ^2 | p-Value | χ^2 | p-Value | χ^2 | p-Value | χ^2 | p-Value | χ^2 | p-Value |
| ≤ 21 | - | | | | | | | | | |
| [22 – 27] | 0,23 | 0,10 | 0,005 | 0,90 | 0,10 | 0,10 | 0,04 | 0,95 | 0,008 | 0,95 |
| [28 – 33] | 1,22 | 0,10 | 0,76 | 0,10 | 0,06 | 0,90 | 2,11 | 0,10 | 1,06 | 0,10 |
| [33 – 39] | 1,55 | 0,10 | 2,35 | 0,10 | 2,84 | 0,05 | 1,23 | 0,10 | 1,63 | 0,10 |
| ≥ 40 | 4,35 | 0,025 | 0,52 | 0,10 | 1,61 | 0,10 | 1,39 | 0,1 | 0,74 | 0,10 |

Table 2 : Confusion test between Symptoms and Age Range

Alcohol and Cigarette as Risk factors

- Nearly 82.1% **drink alcohol** regularly;
- 72.2% have never **smoke cigarette** or others;

Factors linked to times spent practicing one's profession :

- 79.2% of interviewees persons passe between **7 to 14 hours** per day
- And presently some are working from **7 years ago**.

CONCLUSION

1- outdoor pollution has a greater impact on the male gender which exercises occupations related to physical endurance, while women are more exposed to indoor pollution through their activities which are mainly culinary

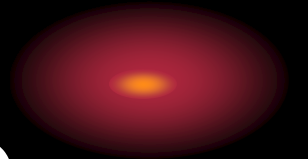
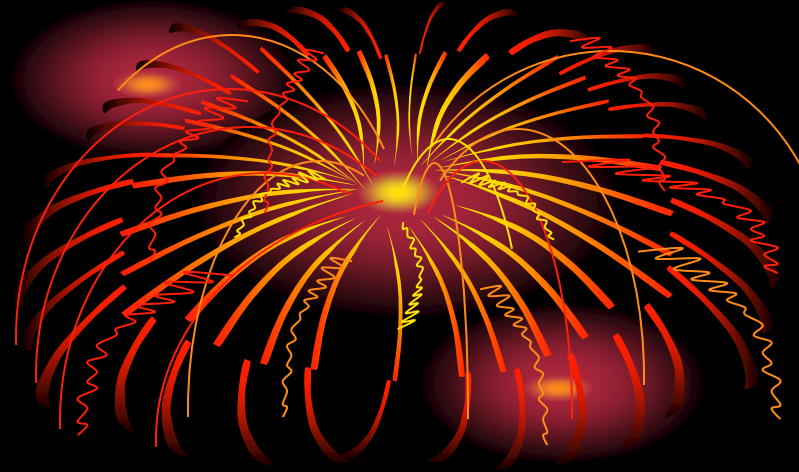
2- One explanation for the high proportion of young people exposed to air pollution is that they are underemployed in Africa, yet their school enrolment is high enough.

3- Tobacco and alcohol are a risk factor for the health related to air pollution. Despite the small number of people who smoke, they are more likely to be confused by smoking

4- Age is confounding for 03 of 06 clinical symptoms felt.

AIR POLLUTION IS AN AGGRAVATING FACTOR FOR MANY DISEASES, ESPECIALLY SINCE PEOPLE EXPOSED ARE ALCOHOLICS OR/AND SMOKERS, MOREOVER IF THEY ARE ELDERLY.





**THANK YOU FOR YOUR KIND
ATTENTION**