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Water, Environment and Health: The impact of the open dump in Brasilia-DF, Brazil

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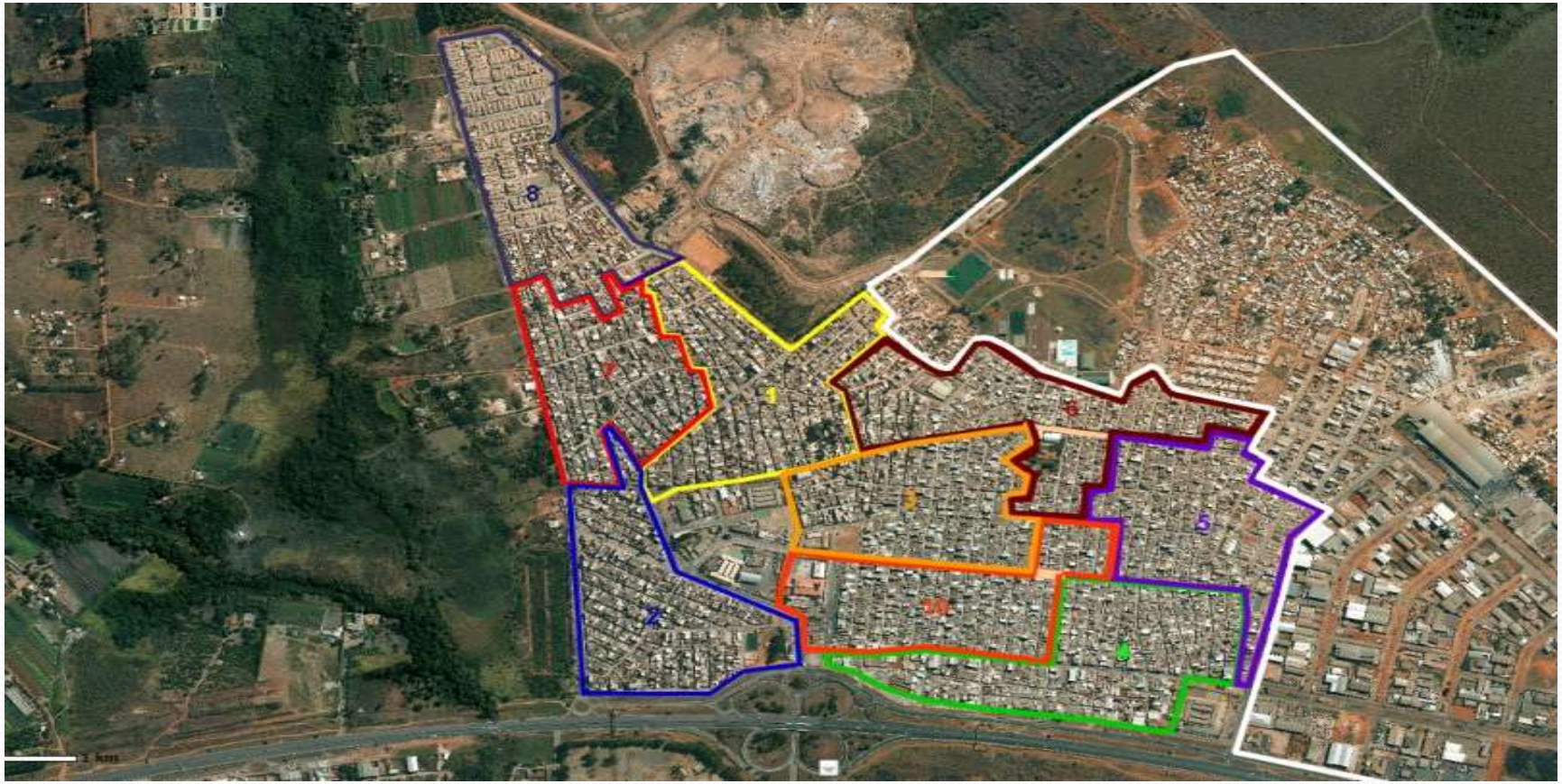
BRAZIL

26 States, 5.570 municipalities with 200 million inhabitants

Open Dump in Brasilia- Biggest of Latin America



Estrutural City- 50000 inhabitants

Introduction

2000 Garbage Collectors (waste pickers)

Possible illnesses

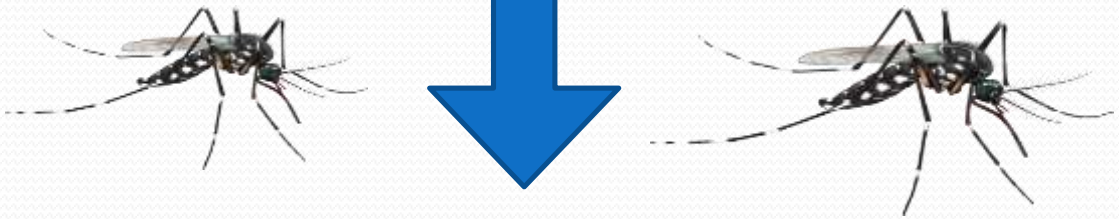
- **Infectious Diseases**- leptospirosis, hepatitis, HIV / AIDS, dengue / zica, tuberculosis, syphilis, leprosy and others
- **Chronic diseases**- Hipertension, diabetis, respiratory diseases and others
- **Intoxication**- heavy metals, pesticides and others
- **Cancer**- oral cancer; lip cancer; skin, lung, bladder and others

ORGANIZAÇÃO MUNDIAL DA SAÚDE. 4ª edição das Guias da OMS sobre Qualidade da Água para Consumo Humano. Geneva: WHO, 2011.
BRASIL. CONAMA. Resolução nº. 274 de 29 de novembro de 2004.

Waterborne diseases

Intake

Slurry



Dengue, Zika Virus
Chikungunya

Aim of the Study

- Based on data resulting from monitoring of groundwater campaigns in the dump area, this study evaluates the degree of contamination of groundwater and recommends monitoring strategies to reduce the vulnerability of the waste pickers who work there and the population living nearby.

Methodology

- To monitor the subterraneous waters at the adjacent areas to the dump, two monitoring wells were used by the Regulating Agency of Water, Energy, and Basic Sanitation of the Federal District – (ADASA) and they are located 200 meters from the dump.

- One well is 30m deep

and the other is 70m deep.

Methodology

The static measurement level (quantitative evaluation) and the collection sample for quality evaluation were done from 2013 to 2016, with a 32-parameter análysis chosen according to the Brazilian legislation for classification and cataloging of aquatic bodies, resolution of CONAMA 357/2005.

Alcalinity (mg/L $CaCO_3$); Total Hardness mg/L $CaCO_3$); Conductivity (µS/cm); Turbidity(NTU); Total Iron (mg/L) pH Chlorides(mg/L) Manganese(mg/L) Barium Lead	Copper Nitrate Nitrite Aluminun Ammonia Zinc Total coliforms (MPN/100 mL) *Escherichia coli* (MPN/100 mL) Level (m

Results

- Microbiological variables, total coliforms and E. coli were not detected in any of the samples.
- The high detected electrical conductivity and chloride values can cause a toxic effect on the micro-organisms by inhibiting their growth and detection in the analysis.
- This does not prove that contamination by leachate is not occurring.

Results

- The electrical conductivity, considered one of the most representative parameters for evaluating the effect of dump contamination, presented values above 1,000 $\mu S.cm^{-1}$ in all the analyzed periods, reaching a maximum of 3,310 $\mu S.cm^{-1}$ in 2013, in the porous well;

- In relation to metals, practically, all analyzed parameters were below what is recommended by Ordinance 2014 Health Ministry (Brazil, 2011) and CONAMA resolution 396 (Conama, 2008), except for lead, in the porous well, which reached a concentration of 0.273 mg \/L, in the porous well and 0.08 in the fractured well (8 times above the Maximum Values Permitted for human consumption).

Heavy Metals

- The heavy metals can be bio accumulative, potentially toxic, and can provoke dermatitis, ulcerations on the skin, cancers, affective disorders, neuromuscular irritation, and cephalgia (Jaishankar et al., 2014).
- To minimize the effects of heavy metals, regulatory agencies have proposed the maximum allowable limits in drinking water (Who, 2011; Usepa, 2015).
- The waste pickers are exposed to eletronic waste, storage batteries (Thurmer *et al.*, 2002).

Conclusions

- After monitoring the porous and fractured domain wells over three years, it can be concluded that there are evidences for groundwater contamination in the vicinity of Structural's dump;

- The data analysis indicated parameters such as electrical conductivity, chlorides, alkalinity, iron and lead in high values and some of them at odds with the Brazilian legislation for drinking water and groundwater quality for human consumption;

- The fact is rather worrying, because the region where the open dump is located is a watershed, where people use water from wells for drinking, a fact that can lead to several health problems.

Monitoring purposes of the water risk and the health conditions of the waste pickers.

Actions	Period
Analyze the quality of groundwater, water surface and in the areas adjacent to Jockey's landfill.	2017
Monitoring puddle water quality in the landfill area.	2017/2018
Monitoring the occurrence of adult and immature forms of Aedes aegypti and characterize the physical and chemical parameters of potential breeding grounds in areas adjacent to Jockey's landfill.	2017/2018
Identify morbidities referred to by waste pickers using an interview through a semi-structured questionnaire	2017
Perform in blood collection from the waste pickers for detecting waterborne diseases in addition to hair and nail collection for identifying metal poisoning.	2017
Correlate found water quality with cases of waterborne diseases and metal-related intoxication and refer them to primary health.	2017
Carrying out educational practices with the waste pickers and population based on critical and reflexive actions.	2017/2018

Thank you!

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