Heat vulnerability index: Exposure, sensitivity and adaptive capacity factors for the city of Abidjan, Côte d'Ivoire

Authors: Etienne Kouakou[1,2], Iba Dely[2,3], Nadège Boko[4], Madina Doumbia[2,3], Abdoulaye Tall[2], Brama Koné[2,3], Guéladio Cissé[1,2] on behalf of the HE²AT Center

1. *Nangui ABROGOUA University, Abidjan, Côte d'Ivoire*
2. *Centre Suisse de Recherches Scientifiques en Côte d'Ivoire (CSRS), Abidjan, Côte d'Ivoire*
3. *Université Pelefero Gon Coulibaly (UPGC), Korhogo, Côte d'Ivoire*
4. *University of Cocody, Abidjan, Côte d'Ivoire. * Corresponding author : **Etienne KOUAKOU***

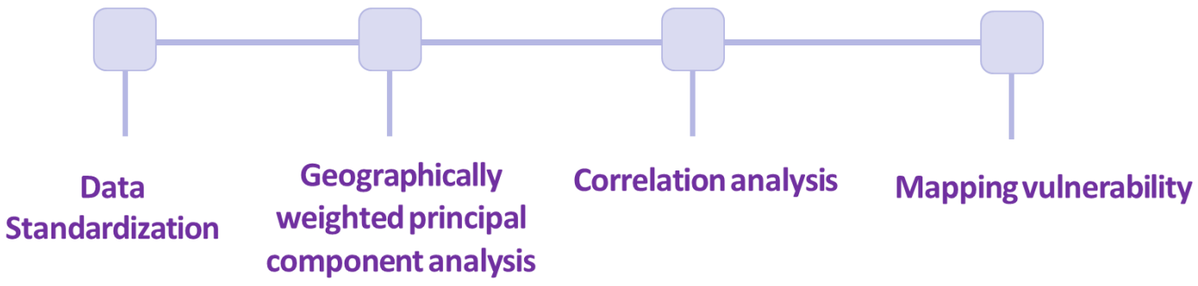
Background

According to the climatology national agency (SODEXAM), there has been an increase in the frequency and amplitude of heat waves in Abidjan over the last ten years (**Djè, 2014**). In addition, Abidjan is experiencing a very rapid urban and demographic growth (**RGPH, 2021**). All of which, in a context of heterogeneity in land use, could accentuate the urban heat island (UHI) effect in the city and increase morbidity due to excess heat. There is therefore an urgent need to document the UHI phenomenon and its effects on the population in order to reduce risks. The objective of this study is to develop a heat vulnerability index across the city settlements.

Methodology

Choice of indicators based on a cartographic approach combined with a qualitative approach (**focus group, household survey**). The indicators were grouped according to the three components of the IPCC concept of vulnerability: exposure-sensitivity-adaptation capacity.

Key stages in the construction of the index



Results

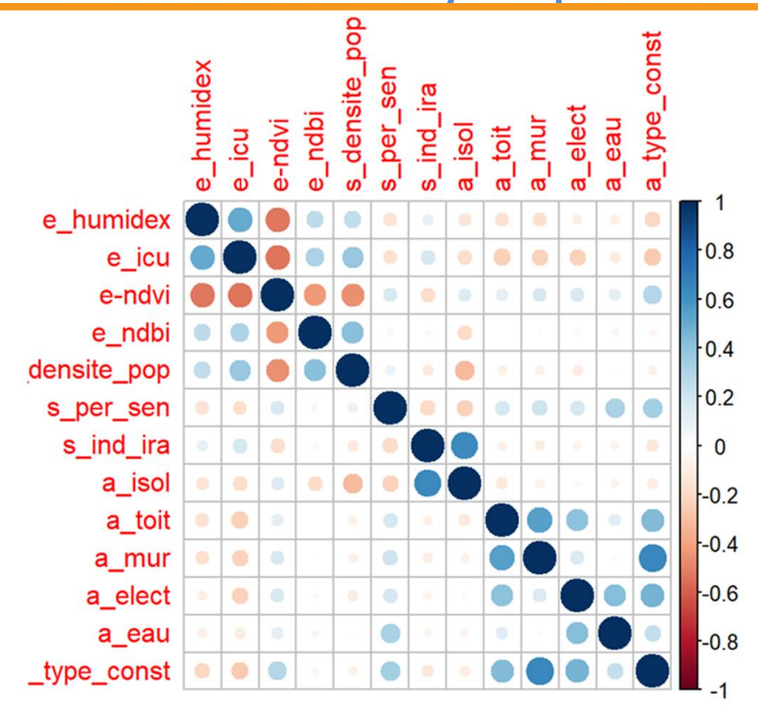
Heat exposure factors

Link between people living in the house and number of rooms occupied.	Number of occupied rooms for precarious neighbourhoods				
	4 rooms	3 rooms	2 rooms	1 rooms	Total
[1 to 2] People	12/4%	0/0%	9/3%	29/9%	50/16%
[3 to 5] Personnes	2/1%	19/6%	90/28%	48/15%	**159/50%**
[6 to 10] Personnes	0/0%	29/9%	63/17%	15/5%	**99/32%**
Others …	0/0%	3/1%	4/1%	0/0%	9/3%
Total	14/5%	51/16%	**156/49%**	**92/29%**	317/100 %

In the neighbourhoods surveyed, **78% of households live in one- or two-room houses**. Furthermore, **65% of these households have between 3 and 10 members**.

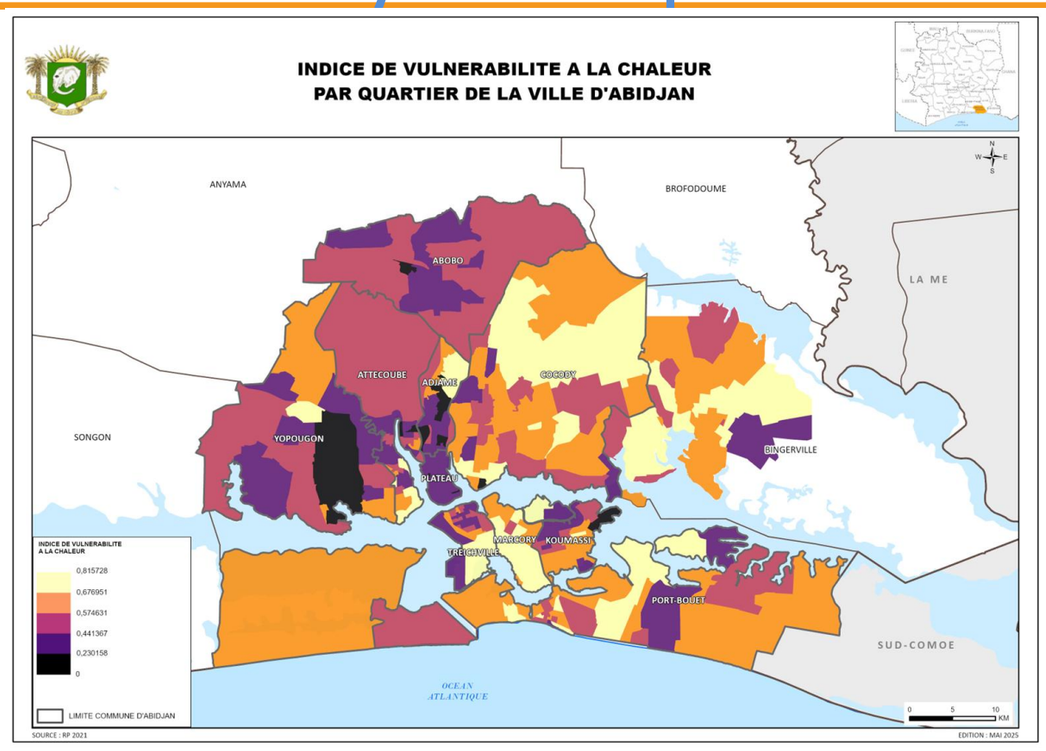
Other factors such as **age**, the type of **roofing material used**, the **place** and **type of activity**, the **economic situation** of the household, were identified as **factors in exposure to heat**.

Correlation matrix of vulnerability components variables



Positive correlations between several variables in the matrix. For example, between the humidex index and heat islands; between sensitive individuals and type of housing.

Heat Vulnerability Index Map



Several neighbourhoods in the municipalities of Abidjan are vulnerable to heat. However, the most vulnerable neighbourhoods are **Treichville, Marcory, Port-Bouët and Bingerville**.

Conclusion

The vulnerability index makes it possible to identify the areas most vulnerable to heat based on several factors. It is an important tool that will help manage heatwave episodes in Abidjan.

References

Djè K. Bernanrd, 2014. Ministère de l'Environnement, de la Salubrité Urbaine et du Développement Durable direction générale de l'environnement. Document de stratégie du Programme National Changement Climatique (2015 – 2020)

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Corresponding Author: Dr. Etienne KOUAKOU, etienne.kouakou@csrs.ci