

Urban heat waves and Environmental Injustices: What are the underlying societal processes?

Introduction: Climate Change & its health effects

As the 11th sustainable development goal emphasizes, more than 55 percent of the Earth's population lives in urban areas, which percentage is set to rise to 70 by 2050. However, climate change is a burden that every city has to face all over the world, regardless of their size or financial status. More frequent and severe heat waves with increased urban heat islands are taking a toll on the population of cities, especially on the most vulnerable groups such as elderly citizens and people living below the poverty line. Across the whole population, but particularly amongst them, heat waves can cause hyperthermia, sleeplessness, heat cramps, heat exhaustion, heat stroke and as a result of all of these, higher mortality rates (Voelkel et al. 2018). The number of researches addressing these issues is rising globally, uncovering more and more environmental injustices related to urban heat waves.

Background: Environmental injustices in cities

Heat wave related environmental injustices can be examined through the theoretical framework of climate injustices, which refers to the socioeconomic, ethnic and other inequalities that can be observed in connection of the negative effects of climate change (Mazzone et al. 2024). These injustices can occur in diverse forms, but the three main categories are distributional, relational and participatory justice (Walker 2012; Angueloski et al., 2025). Environmental injustices in urban contexts often take place in connection with gentrification, which is a process of urban revitalization by which the original, vulnerable inhabitants of an area are displaced, owing to the purchase and upgrading of their deteriorated properties by the middle- or high-income households (Godswill & Ukachukwu 2018).

Methods

The main method of the research behind this poster and our thesis work was case study focused non-systematic literature review. By looking through the international examples, it was possible to analyze the different forms of urban heat related injustices and the underlying processes behind them.

Research question:

How do environmental injustices related to urban heatwaves differ across the world and what common patterns emerge when looking at them from a global health and urban planning perspective?

Research goal:

Identify and analyze the differences and common points of the environmental injustices connected to urban heatwaves with a global health and urban planning perspective.

Results: Case studies

New York: Heat racism

The heat wave related injustices that have a racist background and labelled as heat racism can be observed in many US cities (Angueloski et al., 2025). In New York, to identify the neighborhoods that are the most at risk during extreme heat, NYC Health and Columbia University developed the **New York City Heat Vulnerability Index**. The neighborhoods which received a value of 4 or 5 are inhabited with the most vulnerable population and have limited access to mitigation facilities, such as urban greenspaces. Additionally, **heat racism** can be examined because of the high percentage of Black and Hispanic residents in these communities. To combat the injustices, the Cool It! NYC citywide plan was created with an interactive map that showcases the cooling facilities.

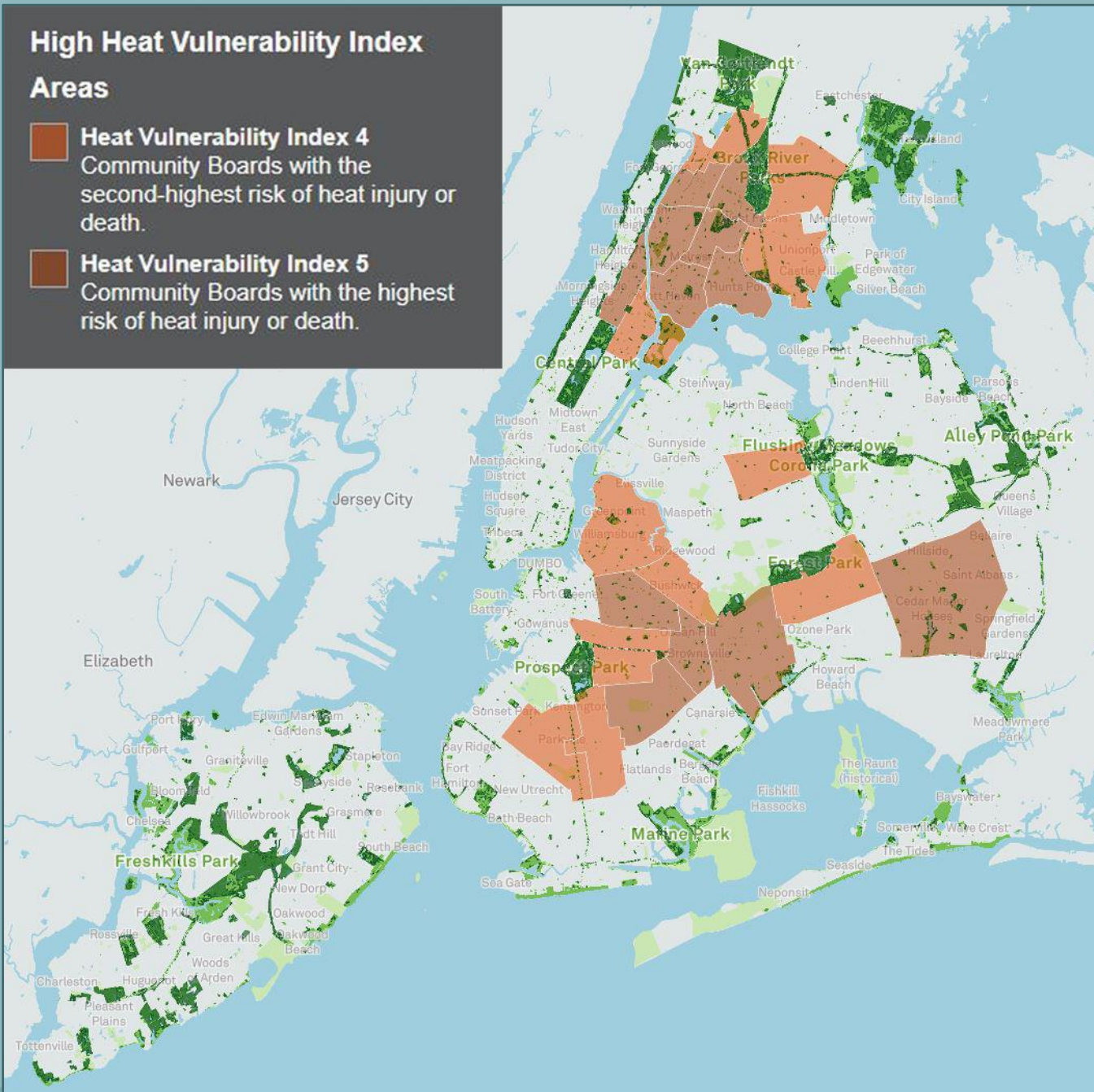


Figure 1: New York Heat Vulnerability Index and the major city parks
Source: www.nycgovparks.org

London: Heat gentrification

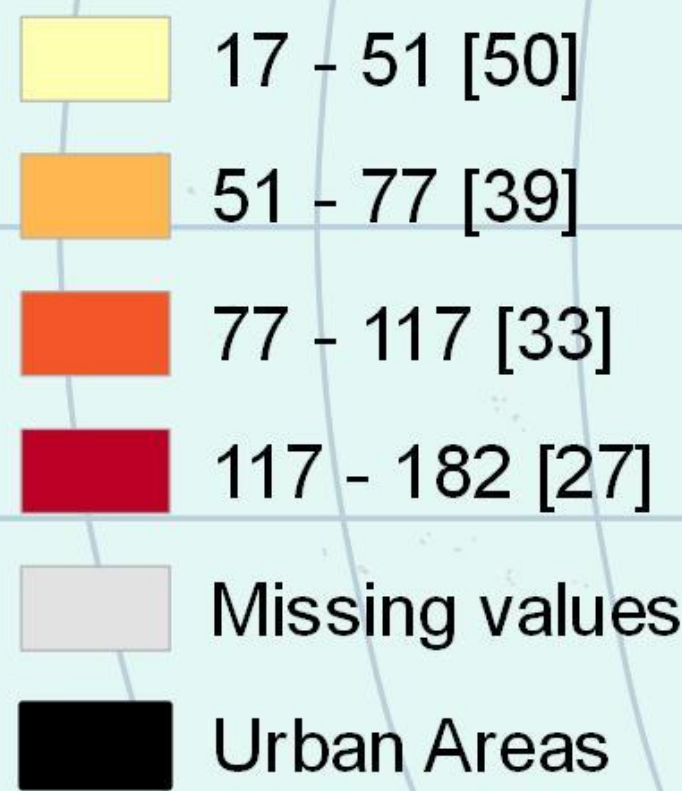
In London, where the first cases of gentrification were recorded by Ruth Glass in 1964 (Godswill & Ukachukwu 2018), the new Elephant Park project **displaced over 3,000 low-income and minority residents**. The project is advertised as the UK's first "climate positive development", with the largest new green space in central London. However, when greening is developed privately as part of new real-estate development, it tends to be underpinned by green grabbing for the profit of investors, as shown by recent studies in Dublin and Glasgow. **Green grabbing** refers to the appropriation of land and natural resources for environmental purposes (for example, greening in the context of climate resilience) and often occurs in connection with **heat gentrification**. The later is a subset of climate gentrification, involving the sociophysical displacement of marginalized residents due to climate effects, and responses related to heat that make some (cooler) homes and neighborhoods pricier and less affordable (Angueloski et al., 2025).

Barcelona:

Unequal heat vulnerability

Unequal heat vulnerability is reflected in the historic cores of many Mediterranean cities in Europe, such as in Barcelona. It especially affects racialized and/or **migrant residents from the Global South** (for ex. Pakistani or Moroccan people) who are living in dense neighborhoods with little access to green space. Moreover, their living situations can be described as cramped apartments with poor ventilation and low energy efficiency. In such homes, inability to afford adequate cooling in the summer (by installing or running an AC unit) is becoming a critical issue in terms of energy poverty and **thermal justice**. Residents in these neighborhoods often face additional socioeconomic challenges, such as direct discrimination in housing access and difficulties on the labor market (Angueloski et al., 2025).

Average days of temperatures above 90th percentile [219]



Rio de Janeiro: Systemic cooling poverty

Systemic cooling poverty refers to the condition in which organizations, households and individuals are exposed to the detrimental effects of increasing humid heat stress as a result of inadequate infrastructures. This is one of the most apparent examples of distributional injustice and can be examined in the **favellas of Rio de Janeiro**. The Black communities living in this tropical megacity are disproportionately affected by the both the large and the micro scale negative effects of global warming. In the framework of climate injustices, this can be labeled as **thermal injustice**, which is defined as the (in)accessibility of people to opportunities that can achieve safe body temperatures and thermal comfort (Mazzone et al. 2024).

Jakarta: Intensifying urban heat island effect

Chronic exposure to heat, especially experienced by inhabitants in tropical cities such as Jakarta, receives less attention compared to other quality of life problems. It is often seen as a low-onset event that requires no immediate action and is not as noticeable and apparent as other extreme weather events. This slow onset environmental hazard **disproportionately affects the population in the lower socio-economic condition**. As a result of poor urban planning decisions, the vulnerable communities have a low access to cooling infrastructure, hence they live and work in an environment prone to extreme heat exposure (Ufaira et al. 2023).

Figure 2: Average amount of days warmer than 90% of temperatures observed in the country over the 1991-2020 period (temperatures above the 90th percentile)
Created by Nándor Trásér via QGIS @2025 Data sources: Arrighi et al. 2024, ESRI ArcGIS

Discussion & Conclusions

Looking through the connecting literature and examining the case studies of five different cities, it can be stated that although heat wave related injustices can appear in diverse ways and can affect different communities, the underlying processes of gentrification related displacement and discrimination from the mitigation infrastructure is a common underlying theme. The vulnerable communities can be described by socioeconomic status, colour, migrant or ethnic background, and they all suffer from the lack of adequate greenspaces or cooling centers. This often leads to heat related health problems and a higher mortality rate but cannot be combated by just simply treating the symptoms. The underlying societal processes, such as rapid urbanization or gentrification needs to be tackled, which first requires adequate research in this field. This step has been already performed in North-America and Europe (Angueloski et al., 2025), but the number of studies have just started to rise in Asia and Latin-America. Moreover, the number of case studies focusing on Africa is scarce, mostly because right now, there are more severe public health problems than heat waves on the continent, but this is about to change rapidly due to global warming (Godswill & Ukachukwu 2018).

References

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