



# Climate Change and Health – Tower Hamlets

## Briefing paper

This report has been prepared on behalf of the Tower Hamlets Public Health Team and was correct as of the date written.

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## Executive Summary

- Climate change is a growing, global problem. Changes in climate that have historically taken hundreds or thousands of years now happen in decades. These changes affect countries, regions and communities differently.
- This report focuses on some of Tower Hamlets key climate challenges in relation to the following: extreme weather, air quality, flooding, lack of green spaces, water and food insecurity and energy efficiency

### Extreme weather

- Hotter summers have a disproportionate impact on urban neighbourhoods with dense housing and limited green space, such as Tower Hamlets.
- Flat dwellers, particularly those living on the top floor, are most affected. It is estimated that over two thirds of London flats could experience temperatures of over 28° C by the 2030s.
- Others at increased risk include the elderly, people with chronic and severe illness, infants, individuals who are drug and alcohol dependant, and homeless people.
- In extreme heat, the chances of dying of cardiovascular or respiratory causes, increase by over 10% in London's most vulnerable districts. Deaths from these diseases are already high in Tower Hamlets compared to other London Boroughs.
- Ventilation has substantial influence on heat exposure. However, this may be constrained by physical building design or by considerations for crime, safety, noise and air pollution.
- LBTH operates a heat alert system during the summer months, and the Local Plan includes policy for managing overheating in new developments.
- For existing housing, and to benefit all residents, particularly the most vulnerable, heat island reduction strategies such as green or cool roofs, cool pavements, or increased vegetation and trees could be employed.

### Air pollution

- Air pollution is particularly high in cities near major transport corridors, where socio-economically deprived people and ethnic minorities are over-represented.
- Air pollution is exacerbated by excess heat.
- In Tower Hamlets, it is estimated that 7% of all mortality can be attributed to particulate air pollution compared to 5.6% nationally.
- The two leading sources of pollution in Tower Hamlets are *transport and construction*.
- Tower Hamlets Air Quality Action Plan outlines the actions it is taking here.

### Flooding

- Much of Tower Hamlets sits very close to sea-level and there are risks associated with heavy rainfall such as sewage discharge and surface water flooding, particularly in the Isle of Dogs. Large parts of Tower Hamlets, including the Isle of Dogs and Lower Lea Valley, are in medium to high-risk flood areas.

### **Loss of green space**

- The amount of open space per resident is reducing in Tower Hamlets.
- Loss of urban green space leads to increases in urban heat and flooding. Green spaces can make a valuable contribution to helping reduce concentrations of greenhouse gases in the atmosphere as well as improve health and reduce isolation.
- Several areas in the Borough are beyond walking distance from parks, namely Whitechapel, Fish Island, Bromley-by-Bow, Poplar Riverside and the Isle of Dogs. Improvements to Tower Hamlets current green space provision are necessary for both climate action and public health.
- Urban greening is a cost effective way of moderating harsh climates locally.

### **Food and water insecurity**

- Climate change affects food security in all its dimensions: access, availability, utilisation, and stability.
- Recent data shows there are more than 4,000 households living in food poverty in Tower Hamlets.
- Alongside cost of living interventions, Tower Hamlets Council supports food insecure households in a number of ways. Alongside these urban food growing approaches offer the potential to address food poverty, improve health, create jobs and improve the environment.

### **Energy efficiency**

- There are more than 10,000 households in fuel poverty in Tower Hamlets.
- Investment in energy efficiency would have a central role in tackling climate change as well as reducing the likelihood of damp and mould, addressing fuel poverty and reducing the ill-health associated with living in cold and/or damp environments.

### **Conclusion**

- Climate change poses risks to Tower Hamlets residents. These include
  - more frequent episodes of extreme heat during the summer months,
  - risks to health from air pollution, exacerbated by loss of green space,
  - increased risk of flooding due to wetter winters and rising sea levels.
- The co-benefits of tackling climate change are numerous and include better air quality, mental health, community cohesion fewer deaths and a reduction in long term conditions.

# 1. Introduction to Climate Change

Climate change refers to long term shifts in temperatures and weather patterns. Since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas for electricity, heating and transportation. Changes in climate that have historically happened over hundreds and thousands of years are now happening in decades. Burning fossil fuels generates greenhouse gas emissions that act to insulate the earth, trapping the sun's heat and increasing temperatures. Climate change is a **global problem**, but it affects different countries, regions, and communities differently.

This briefing paper will summarise the health impacts of climate change in Tower Hamlets with a focus on:

- Extreme Weather
- Green Space
- Air Quality
- Food Insecurity
- Energy Efficiency

## Vulnerability Factors

Climate change does not affect everyone equally, and our ability to prepare for, respond to, and recover from the effects of climate change depend on our physical and mental capacity, where we live and work, and the resources available to us (see Figure 1).

### Ability to Prepare:

Our awareness and physical and financial capacity all dictate how able we are to prepare.

People in deprived areas are more likely to live in poorly ventilated homes or accommodation with limited access to green space and limited options to improve housing conditions.



### Ability to Adapt:

Adapting to climate change depends on our awareness of climate change as a problem and our physical and financial capacity to adapt our behaviours to mitigate the impact.

### Ability to Recover:

Recovery will depend on our physical reserve.

**Figure 1: Vulnerability to climate change; Source: Lambeth DPH Report 2020.** The wheel shows ability to prepare, ability to adapt and ability to recover on the outer wheel; health, demographics and behaviour on the middle wheel and socio-economic status at the centre of the wheel.

**Certain groups are more vulnerable to the effects of climate change than others** and bear a disproportionate burden of the adverse health outcomes.

Identifying these populations and what underpins their vulnerability can help inform the appropriate responses needed to mitigate adverse health outcomes and reduce health inequality by ensuring the responses are targeted. The extent of impact on a group of people can be determined by exposure, sensitivity, and adaptive capacity. *Exposure* refers to contact between an individual and a climate-related hazard such as high temperatures or flooding. *Sensitivity* is the degree to which the individual is affected by a climate change exposure, and may vary depending on factors such as health and age. *Adaptive capacity* refers to an individual's or community's ability to evade or cope with exposure to a climate hazard (National Institute of Environmental Health Science, 2022). **Vulnerability assessments** that consider these factors should be conducted when planning interventions, alongside working with communities to co-produce support. Working with communities, rather than imposing interventions on them may enhance community resilience and engagement with interventions (National Institute of Environmental Health Science, 2022).

Any strategies designed to help people and communities adapt, particularly those which place responsibility on the individual to act or change their behaviour, need to be coupled with communications campaigns and financial support to ensure equitable access to the measure.

## 2. Extreme Weather

Worldwide, as a result of climate change, the number of weather-related disasters have **more than tripled** since the 1960s. Every year, these disasters result in over 60,000 deaths, mainly in developing countries. Causes include flooding, rising sea levels, extreme heat and variable and extreme precipitation (WHO, 2021). In the UK, climate change has led to greater seasonal variation in weather patterns, meaning wetter winters, with more flooding and severe storms and hotter, drier summers causing drought, excess death and increases in air pollution. Severe weather affects health and increases mortality, particularly amongst **older people, children and those with long-term conditions** (LWEC, 2015).

### Heat and rising temperatures

Average temperatures in the UK are increasing due to climate change but London is getting even hotter. This is due to the Urban Heat Island (UHI) effect, caused by the increased capacity of urban land surface (roads, buildings etc) to trap more heat, both from the sun and human activity, than vegetation, water and soil do. The UHI can mean that **cities are up to 10°C hotter than surrounding countryside** (Mayor of London, 2022). Alongside this, climate change has caused an increase in frequency and severity of heat waves.

In England, one of the biggest risks from extreme heat is hospital admission and death due to **cardiovascular and respiratory illness**. Groups at increased risk include the **elderly, people with chronic and severe illness, infants, homeless people, and individuals who are drug and alcohol dependant** (UKHSA, 2022). Heat can exacerbate respiratory and cardiovascular conditions by increasing stress on the body and pollution in the air. In summer 2022, temperatures in the UK exceeded 40°C for the first time. During this ten-day period, the ONS reported 2,227 excess deaths in the UK, 10.4% above average. It is projected that numbers of heat related deaths will triple by 2050.

Heat waves not only impact our physical health, but they can also worsen **mental health**. High temperatures and humidity have been linked to a rise of symptoms in people with depression, generalized anxiety disorder and bipolar disorder. Research has found that for every 1°C increase in monthly average temperature, mental health-related deaths increase by 2.2%. Heat waves also impact cognitive ability, increasing **aggressive behaviour and violent crime rates** (World Economic Forum, 2022).

In addition, warmer temperatures could see non-native mosquito species establishing in parts of the UK, and the diseases they carry can be transmitted to humans. The UK already has around 30 species of mosquito, some causing nuisance biting. The **emergence of mosquito-borne viruses**, such as West Nile Virus or dengue fever, is an increasing risk to UK public health due to a warming climate, and we have already seen evidence of this virus in the Netherlands and Germany, and outbreaks in Italy associated with hot spring weather. (UKHSA, 2021).

**Densely built neighbourhoods** with limited open space and green areas, such as those in Tower Hamlets, increase people's exposure to heat, but the geometry of the buildings and how they are built also influence exposure. **Top floor flats** experience greater thermal stress than ground floor flats. Ventilation has substantial influence on heat exposure – it may be constrained by physical building design or by considerations for crime, safety, noise and air pollution. Many of these factors leading to greater exposure come together in deprived urban neighbourhoods (Pavoola, J., 2017).

For every 1°C increase above the heat threshold (19.6°C in London), there is a 1% ambulance callout increase and a 2.1% mortality increase. Over the next decade, UK heat related mortality could increase by over 60%. Combined with an ageing population, this could jump to over 500% by the 2080s if adaptation measures are not taken. **By the 2030s, over two thirds of London flats could experience temperatures of over 28° C**. In times of extreme heat, the chances of dying of cardiorespiratory causes increase by over 10% in London's most vulnerable districts, while there is almost no effect in the most resilient districts.

Many Tower Hamlets residents are particularly vulnerable to the effects of extreme heat as Tower Hamlets is the most densely populated borough in the country with limited open and green spaces which increases the risk of extreme heat.

Tower Hamlets **mortality rates are already high for cardiovascular and respiratory disease**. Tower Hamlets has the second highest rate for death by respiratory disease in London (PHE Fingertips, 2020). The second most common cause of emergency admission to hospital in the borough is respiratory disease at 1.1 per 1000 population (LBTH, 2016). This is **expected to increase as summers get hotter**.



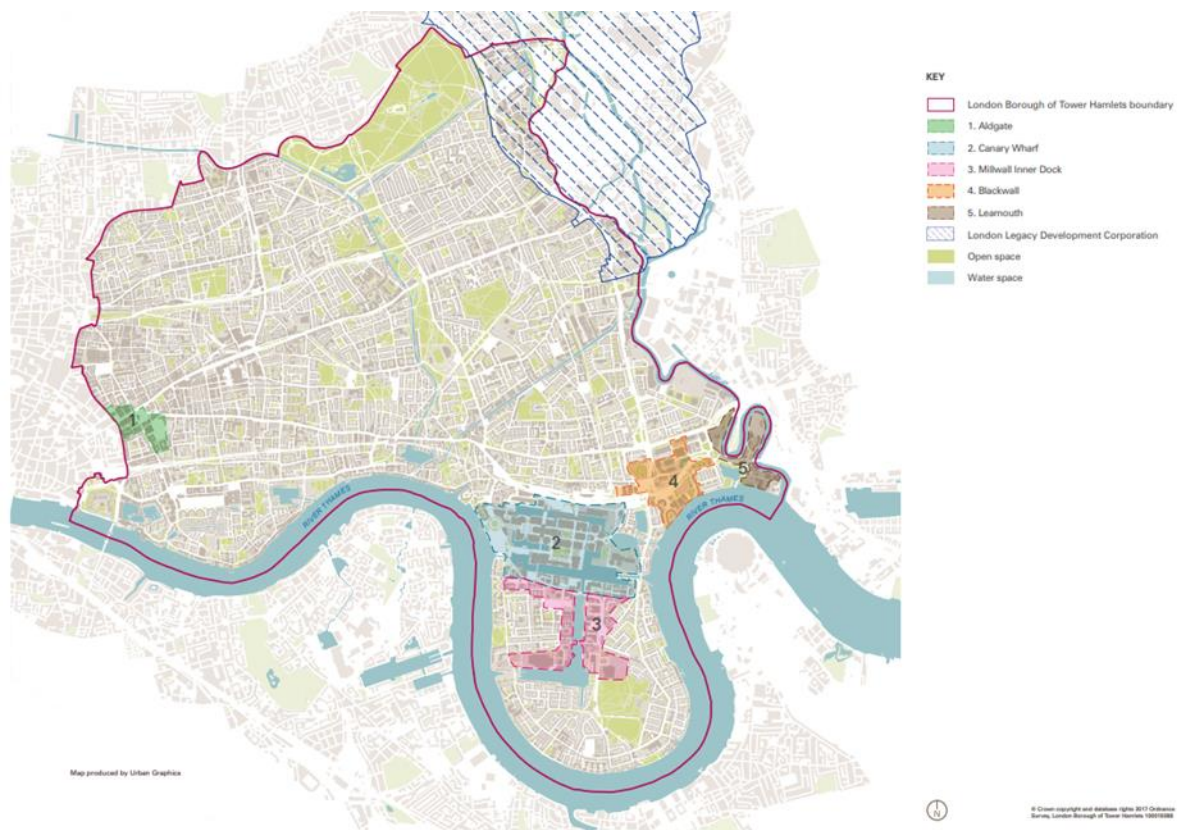
According to the London Climate Change Partnership, areas at particular risk of experiencing the urban heat island effect include the following:

- Areas of high-density development with clusters of tall buildings. This includes developments within identified Tall Building Zones (see Figure 2.)
- Areas experiencing high levels of pollution (see Figure 3.)
- Areas without green spaces (see Figure 5.)

## Mitigation Measures and health benefits

The Tower Hamlets Local Plan includes **policy on managing overheating for new developments**, Policy D.ES10. Local Plan Policy D.ES3 on urban greening and biodiversity states that the risk of experiencing the 'heat-island' effect should be considered over the lifetime of a new development.

Tower Hamlets Adverse Weather Protocol includes a **heat alert system**. The heat alert system is activated each year during the warmest months of the year between 1st June and 15th September. Alert levels 2-4 are triggered when the Met Office forecasts that extremely hot weather is expected that reaches or exceeds the thresholds that are set out nationally as the temperature levels that represent a risk to health.



**Figure 2: Developments within identified Tall Building Zones in Tower Hamlets, Tower Hamlets Local Plan 2031.** The map shows a series of tall building zones to make it clear where tall buildings will be directed. The key lists these tall building zones as being in Aldgate, Canary Wharf, Millwall Inner Dock, Blackwall and Leamouth. The key also identifies London Legacy Development Corporation, Open space and Water space.

Communications on how to stay safe in the heat will be disseminated through council channels to staff and residents. These differ depending on the level of alert.



Consideration should be given to how this would work in practice should there be a period of prolonged heat.

Protecting residents from the effects of extreme heat and flooding will have a positive effect on their health and wellbeing, resulting in reduced heat-related cardiovascular and respiratory conditions and will protect mental health from the effect of flooding.

#### What more could be done?

To improve resilience to future extreme heat events, cities can incorporate **heat island reduction strategies**—such as green or cool roofs, cool pavements, or increased vegetation and trees—into long-term planning efforts to help lower urban temperatures. Such cooling measures help to reduce impacts on public health and urban systems from extreme heat events (EPA, 2022).

### 3. Air Quality

Air Pollution is **one of the UK's biggest killers**, causing an estimated 36,000 premature deaths per year (Friends of the Earth, 2022). It is widely acknowledged air pollution can contribute to an increase in **hospital admissions and deaths from cardiovascular diseases, respiratory diseases and lung cancer**. Research has also identified that exposure to air pollution can have a negative effect on **diabetes** and **neurological disease** and there is evidence to suggest pregnant women exposed to air pollution are at risk of delivering a **premature or low birth weight** baby (Royal College of Physicians, 2016).

Air pollution is primarily caused by **emissions** such as those from vehicles or industry, that contribute to climate change. Air pollution is **exacerbated by excess heat**. When it is hotter, air moves more slowly and so pollution, such as exhaust fumes, builds up at ground level. In a similar way, pollen is also trapped and can exacerbate symptoms of hay fever. A particularly dangerous pollutant is ozone. Ground-level ozone is made when nitrogen dioxide from vehicle exhaust, for example, reacts with UV light from the sun.

The pollution of air by nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>) and particulate matter (PM) is associated with **increased all-cause and cardiovascular mortality and morbidity**, and exposure to elevated concentrations of ozone over shorter periods of time is associated with increased **respiratory mortality and morbidity**. **The ONS estimates that 7% of all mortality in Tower Hamlets can be attributed to particulate air pollution**, this is compared with 5.6% in England as a whole. Warmer weather, more frequent heat waves, changes in rainfall and altered volatile organic compound concentrations may increase future O<sub>3</sub> and PM concentrations. The evidence from recent heat waves such as that of 2003 suggests that in the UK **a third of the excess mortality experienced during a heat wave may be caused by exposure to elevated concentrations of O<sub>3</sub> and PM<sub>10</sub>** (Pavoola, 2017).

NO<sub>2</sub> concentrations are **particularly high in cities near major transport corridors** where socio-economically deprived people and ethnic minorities are over-represented. If PM concentrations have similar distribution patterns, then their increase in a changing climate would increase the exposure of the same people to the adverse health outcomes of PM. The situation with O<sub>3</sub> is more complex as high urban NO and NO<sub>2</sub> concentrations inhibit the formation of O<sub>3</sub>. However, high

O<sub>3</sub> concentrations could increase in cities in the future if public policies do succeed in bringing down urban nitrogen oxide emissions (Pavoola, 2017).

In 2013, 58% (41/70) of primary schools in Tower Hamlets and 64% (14/22) of secondary schools were in areas that exceeded the NO<sub>2</sub> Annual Mean UK Air Quality Strategy objective of 40 µg/m<sup>3</sup>. By 2016, this figure had increased to 78% (55/70) of primary schools and 86% (19/22) of secondary schools<sup>1</sup>. By 2019, in Tower Hamlets:

- Only four schools (three primary schools and one college) exceeded the legal limit of 40µg/m<sup>3</sup> for NO<sub>2</sub>
- 101 educational institutes exceed the interim WHO guideline of 30µg/m<sup>3</sup> for NO<sub>2</sub>
- All educational institutes exceed the interim WHO guideline of 10µg/m<sup>3</sup> for PM<sub>2.5</sub>.

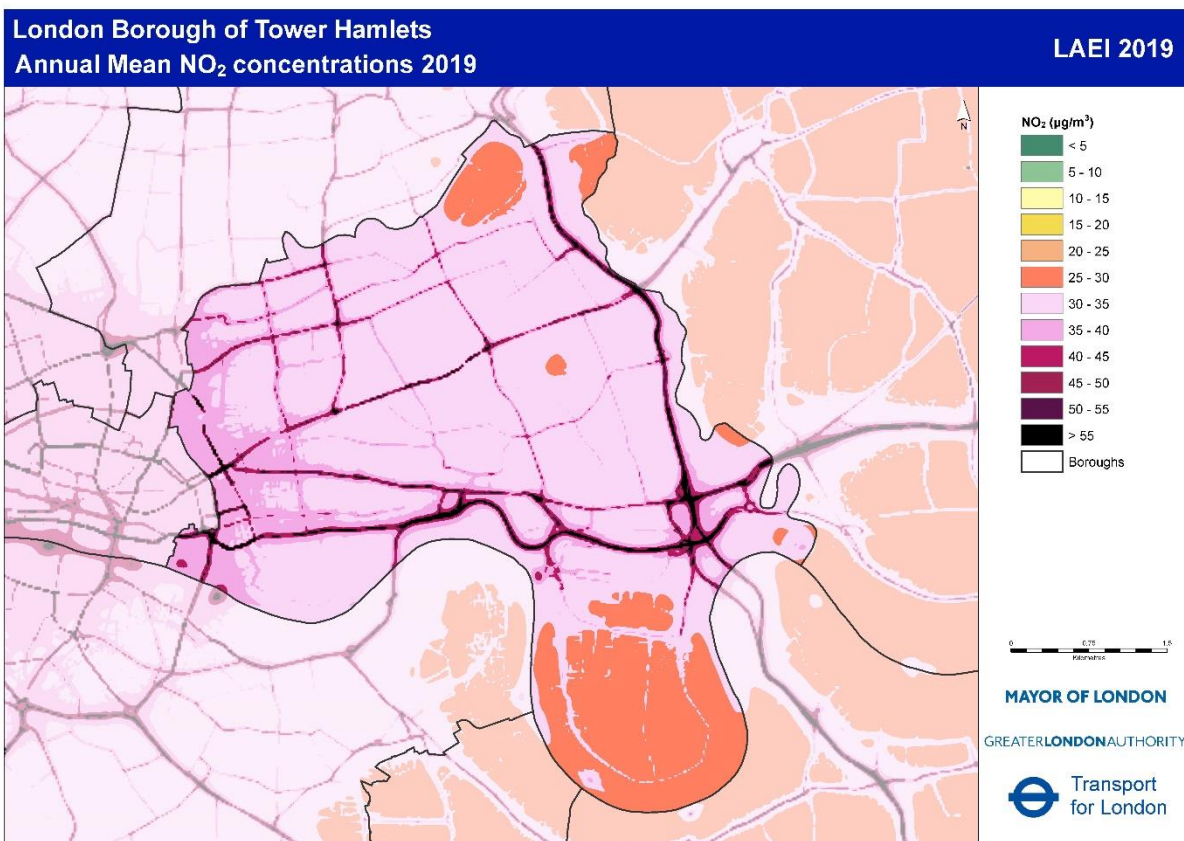
This is a **huge reduction in school aged children's exposure to NO<sub>2</sub>** but there is still work to be done.

Research by Kings College London University investigated the link between traffic derived air pollutants and lung function in 8 to 9 year old children living in East London's Low Emission Zone. The research showed that **children from the most polluted areas have 5 to 10 per cent less lung capacity than children in areas that meet the UK Air Quality Strategy objective** (Mudway et al, 2019). Over six years, researchers examined the lung function of 2,400 children at 25 schools across east London and found a direct correlation between air pollutant exposure and reduced lung capacity.

**Social deprivation and age** pre-dispose people to cardiovascular illness, which in turn compounds the effects of elevated O<sub>3</sub> and PM concentrations on health. In 2008, the most deprived quintile in the UK experienced 50% higher cardiovascular disease mortality than the least deprived quintile. Women in non-professional jobs are five times more likely to die from cardiovascular disease than women in managerial and professional jobs. Social deprivation can also constrain adaptive capacity by limiting people's ability to relocate and to take other measures to avoid exposure or to reduce sensitivity (Pavoola, 2017).

Amongst London boroughs, LBTH has the **9th highest mortality rate** attributed to human made air pollution, higher than the London and England average, and has the 6th highest levels of fine particulate matter (Tower Hamlets Air Quality JSNA, 2024 - unpublished).

The map below shows areas of substandard air quality in Tower Hamlets (Figure 3):



**Figure 3: Annual mean NO<sub>2</sub> concentrations in Tower Hamlets, 2019:** (The London Atmospheric Emissions Inventory, Tower Hamlets, 2019). A key shows NO<sub>2</sub> concentrations determined by colour.

## Mitigation measures and health benefits

The two leading sources of pollution in Tower Hamlets are **transport and construction**. The [Air Quality Action plan](#) (2022) outlines various measures to mitigate the health impact of air pollution to Tower Hamlets residents and recommendations for measures that could reduce air pollution.

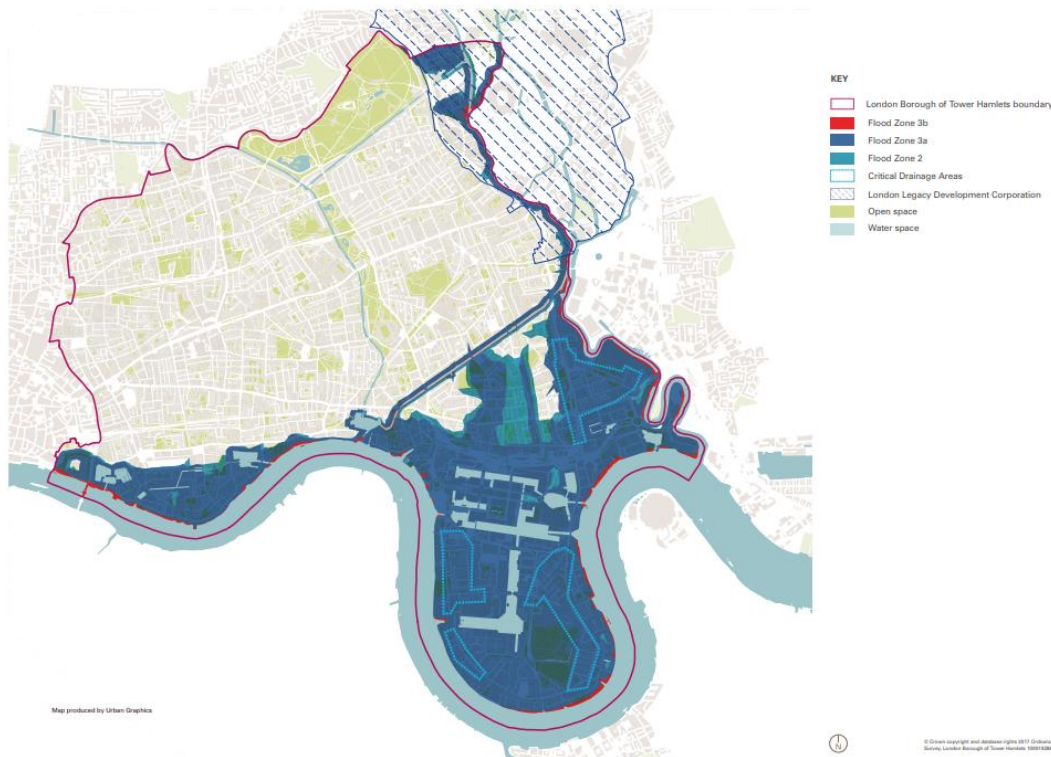
## 4. Flooding

Increased risk of flooding is another weather-related impact of climate change. Tower Hamlets is particularly vulnerable to this given much of it **sits very close to sea-level**. The UK Climate Control Committee (CCC), warned in 2019 that 1.4 million people in England face a risk of 1:75 or greater of some kind of flooding (LSE, 2021). Alongside financial impacts and effects, such as displacement, **direct physical health impacts** of flooding include drowning, electrocution and other accidental deaths and injuries. **Indirect health impacts** can occur due to contamination and loss of water supply, loss of access to transport, electricity supply and communications. Flooding can also undermine **health care provision** by overwhelming the capacity of emergency services, causing power cuts and supply disruptions, and flooding health care facilities. Economic losses and disturbance can also lead to **mental health problems**: flooding can cause psychological distress which can result in depression, anxiety, and post-traumatic stress disorder (PTSD). One study showed that over a third of people were suffering from PTSD one year on

from being affected by flooding. People flooded by the 2007 summer floods in Gloucestershire and Yorkshire were two to three times more likely than non-affected people to report mental health problems (Pavoola, 2017). More frequent and severe rainfall events due to the changing climate, including a projected 35% winter increase in precipitation by 2050, will significantly increase the risk of fluvial, surface water and property flooding in the borough.

Whilst the Thames Barrier and other flood defences currently provide effective protection, their continued maintenance, along with further investment in flood defences, is required. There are still risks associated with heavy rainfall such as sewage discharge and surface water flooding particularly in the Isle of Dogs (IOD) and Lower Lea Valley both of which are in medium to high-risk flood areas.

The borough has several critical drainage areas which are at higher risk of surface water flooding. Despite this, London has lower rainfall than the national average, whilst having a very high population density. This combination has resulted in **London being declared an area of serious water stress** and this trend is likely to be exacerbated by climate change. The map in Figure 4 shows flood zones in Tower Hamlets.



**Figure 4: Flood Zones in Tower Hamlets, Tower Hamlets Local Plan 2031.** The key shows London Borough of Tower hamlets boundary, Flood Zones 3B, 3A and 2 and Critical Drainage Areas.

### Mitigation Measures and health benefits

Policy D.ES4 in the Tower Hamlets Local Plan requires **new developments** to reduce the risk of surface water flooding through water re-use and **sustainable drainage systems**. Major new developments must submit a drainage strategy and the policy also sets run-off rates that are to be achieved.

The 2024 Level 1 and Level 2 Strategic Flood Risk Assessment for Tower Hamlets provides recommendations for LBTH to consider as part of the Local Plan



development in relation to key flood risks and opportunities for development within the Borough. The 2024 Infrastructure Delivery Plan contains proposals (currently uncommitted) for remodelling critical drainage areas and repairing and maintaining flood defences.

## 5. Loss of Green Space

The loss of urban green space leads to **increases in urban heat and flooding**, which are amplified by climate change and can threaten human health, well-being and property. Green spaces also increase the opportunity for social interaction which is important in tackling loneliness and enabling community cohesion. Publicly accessible green space is free to use and so are vital resources for those on low incomes and people who live in accommodation without access to a garden.

According to Safeguarding our Soils, a Strategy for England (Defra, 2009) soil plays a vital role in the fight against climate change. Open spaces and previously developed land can make a valuable contribution to helping both **reduce concentrations of greenhouse gases** in the atmosphere (the cause of climate change), and to help adapt effectively to the impacts of change, building resilience.

The functionality of open green spaces becomes increasingly important when viewed against the backdrop of a changing climate. The UKCIP09 climate change scenarios suggest increases in the average summer temperature of between 1°C and 5°C by the 2080s and an increase of 30% in average winter rainfall. These scenarios do not take the urban surface into account and the factor of increase is likely to be **significantly higher in densely urbanised areas** (Ciria Open Space, 2022).

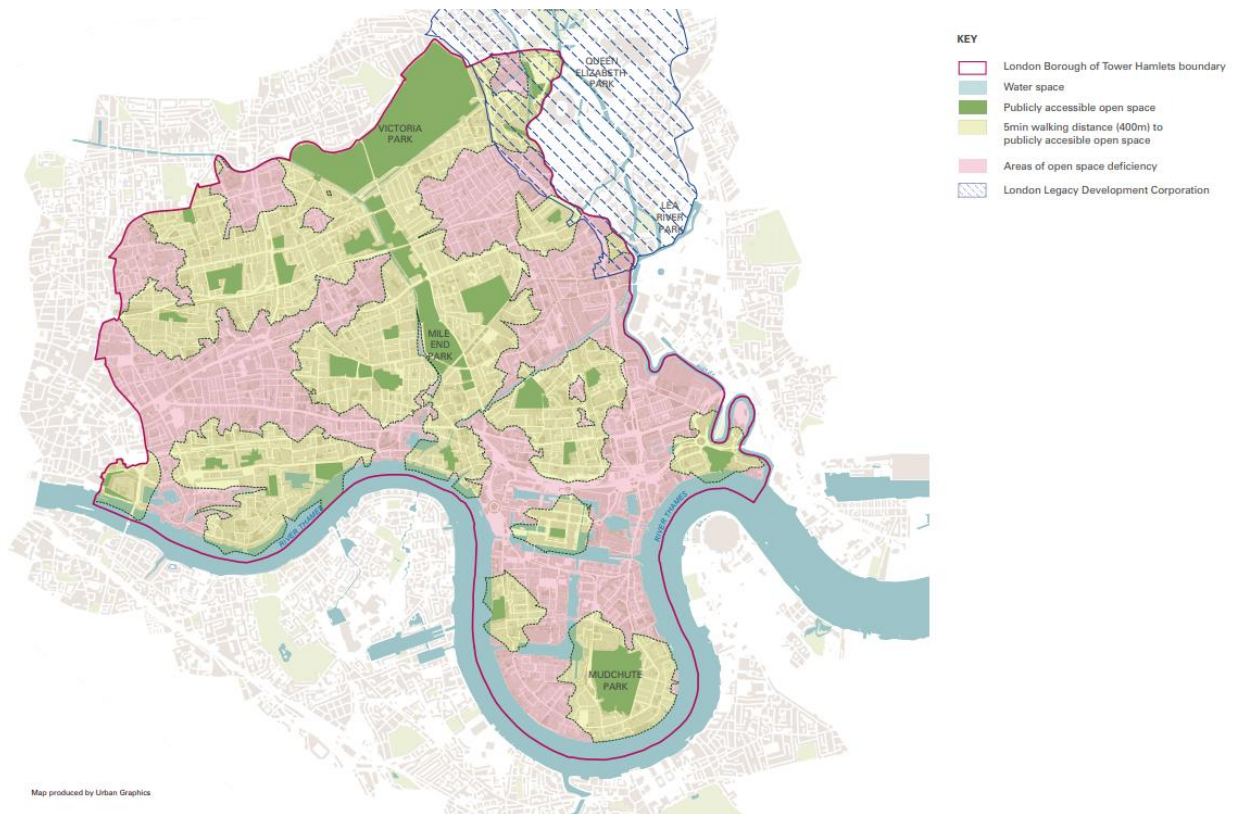
### The local picture

Providing new open space continues to be a challenge in Tower Hamlets - even with investment, rapid population growth is a challenge for the provision of open space. As a result, the **amount of open space per resident is reducing**. Population projections show that more wards will have more pronounced open space deficiency by 2031: only two wards (Mile End and Bow East) are projected to have above 1.2 ha/1,000 residents, which is the Tower Hamlets standard (LBTH, 2017).

Large parts of the borough, where significant population increase is expected, are **beyond walking distance (400 m) from parks** above two hectares. The following areas are particularly affected by this: **Whitechapel, Fish Island, Bromley-by-Bow, Poplar Riverside and the Isle of Dogs**.

Tower Hamlets has a range of sites of biodiversity value, including areas of open space, waterways and formally designated Sites of Importance for Nature Conservation (SINCs). Living building elements enhance biodiversity, both directly through planting and indirectly through providing habitats. They also have flood reduction, climatic and air quality benefits, helping to remove carbon dioxide from the air and reduce temperatures.

Figure 5, below, illustrates the green space deficiencies in the borough.



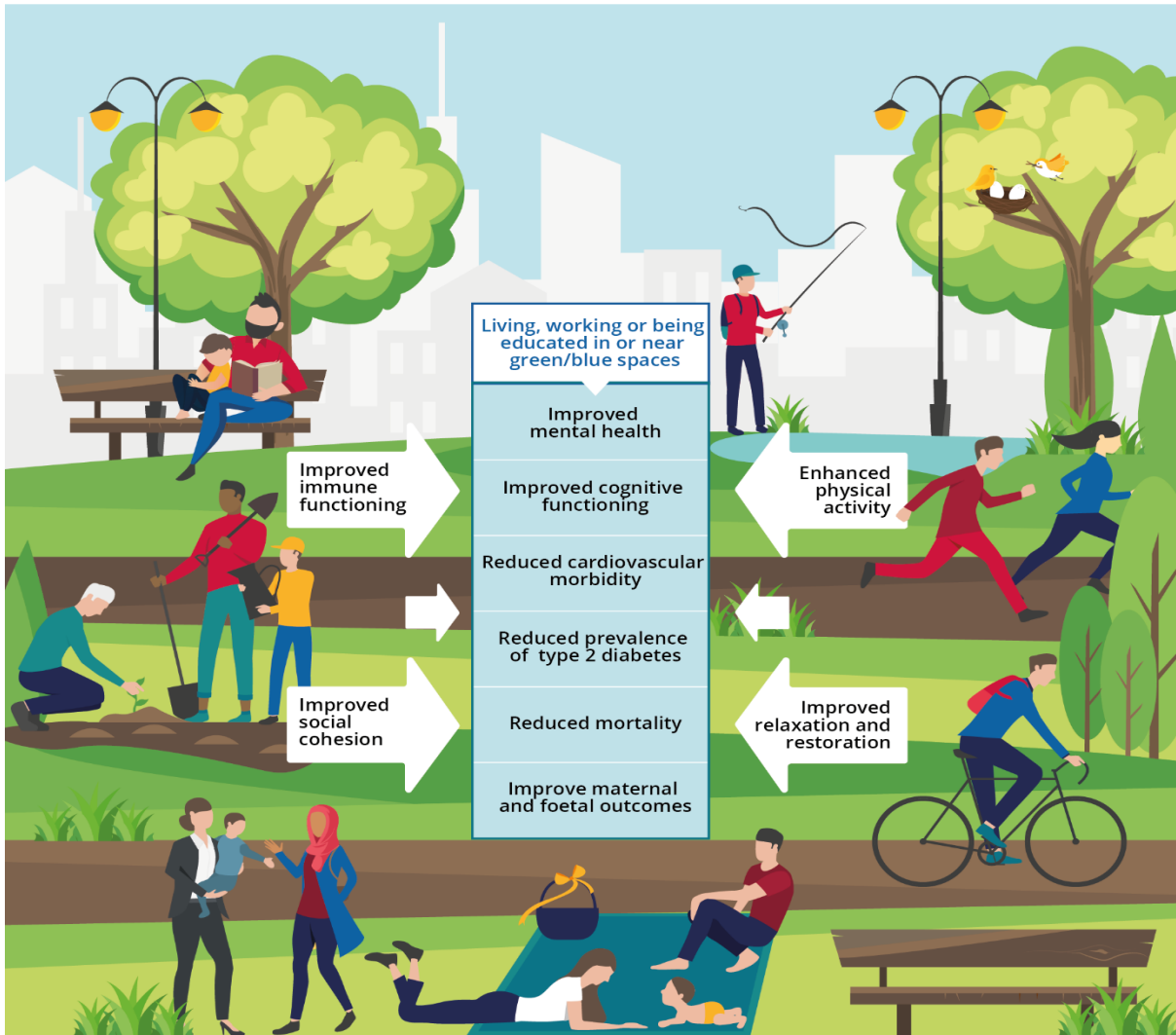
**Figure 5: Open Space Deficiency in Tower Hamlets, Tower Hamlets Local Plan 2031.** Green space deficiencies are outlined. The key shows London Borough of Tower hamlets boundary, Water space, Publicly accessible open space, 5 minute walking distance (400m) to publicly accessible open space, areas of open space deficiency and London Legacy Development Corporation.

## Mitigation measures and health benefits

Tower Hamlets Local Plan includes a policy around urban greening and biodiversity (Policy D.ES3). Alongside the importance of trees and plants in removing carbon from the atmosphere and boosting biodiversity, access to green space has a significant effect on physical and mental wellbeing. Improvements to Tower Hamlets current green space provision are necessary for both climate action and public health work.

**Urban greening** is a cost-effective way of moderating harsh climates at a local level. Trees and vegetation have a natural cooling effect as they provide shade, potentially reducing surface temperature, by up to 5°C. In addition, evaporation from vegetation consumes a significant proportion of the available heat energy in the atmosphere. This energy is used to convert water in the leaves into water vapour, which is then transpired through the trees. For some locations, it has been estimated that evapotranspiration can reduce peak summer temperatures by 5°C.





**Figure 6: Health Benefits of urban green and blue spaces.** Living, working or being educated in or near green/blue spaces can contribute to improved immune functioning, improved social cohesion, enhanced physical activity and improved relaxation and restoration. This can improve mental health, improve cognitive functioning, reduce cardiovascular morbidity, reduce prevalence of type 2 diabetes, reduce mortality and improve maternal and foetal outcomes.

Green infrastructure provides areas where natural processes, such as evaporation and runoff interception, can continue to occur. However, ecosystem services provided by green infrastructure are often overlooked and undervalued. Instead, harmful processes such as tree felling to reduce hazards near roads, development of infill in gardens and the redevelopment of biodiverse “urban wastelands” degrade the ability of the city to regulate temperature and provide other valuable services to inhabitants (Ciria Open Space, 2022).

Accessible and high-quality urban green and blue spaces, such as parks, urban forests, tree-lined streets, allotments, riverbanks and coastlines, provide significant health benefits to local communities (see Figure 6). In summary these include:

- Enhanced physical and mental development in children by living, learning and playing in green environments.
- Improved physical health and social wellbeing for the elderly through visiting green spaces.
- Improved air quality.

- Reduced levels of noise.
- Enhanced biodiversity.
- Moderating temperatures during heatwaves and providing cool and shelter.
- Increased physical and mental health by providing space to exercise and relax (EEA, 2022; van den Berg et. al., 2015.)

## 6. Food and Water Insecurity

Climate change is already having a negative impact on food and nutritional security, mainly through **disrupted food production** around the world, particularly in the Global South. This is leading to considerable health burdens, especially in poorer parts of the world. These impacts also pose risks to the UK food system. For instance, whilst foods like cereals, potatoes, dairy and eggs are predominantly produced in the UK, we are more dependent on imports for our supply of fruits, pulses, and vegetables (UKHSA, 2021).

Climate change has both direct and indirect impacts on **agricultural production systems**. Direct impacts include effects caused by a modification of physical characteristics such as temperature levels and rainfall distribution on specific agricultural production systems. Indirect effects are those that affect production through changes to the environment's effect on other species such as pollinators, pests, disease vectors and invasive species. These indirect effects can play a major role but are often more difficult to assess given their complex nature of interaction between many variables.

Climate change also affects **livestock production** in multiple ways. The most important impacts are experienced in animal productivity and health as well as yields of forages and feed crops. In various countries in sub-Saharan Africa, 20 to 60 percent losses in animal numbers were recorded during serious drought events in the past decades. In South Africa, dairy yields may decrease by 10 to 25 percent because of climate change. Increased temperatures and reduced precipitation can cause important drops in forage production, such as the 60 percent deficit of green fodder during the 2003 summer in France (FAO, 2015).

**Fruit and vegetable production**, a key component of healthy diets, is also vulnerable to climate change. Declines in yields and crop suitability are projected under higher temperatures, especially in tropical and semi-tropical regions. Heat stress reduces fruit set and speeds up development of annual vegetables, resulting in yield losses, impaired product quality, and increasing food loss and waste. Longer growing seasons enable a greater number of plantings to be cultivated and can contribute to greater annual yields. However, some fruits and vegetables need a period of cold accumulation to produce a viable harvest, and warmer winters may constitute a risk (Mbow et al., 2019).

At national level, exposure to climate risks can trigger shocks on agricultural production and food availability, with risks of market disruptions, effects on supply and storage systems, as well as increases in agricultural commodity prices (food and feed), impacting accessibility and stability of food supplies for the entire population, particularly in countries with significant shares of the population spending a large part of their income on food (FAO, 2015).

Climate change affects food security in all its dimensions: access, availability, utilisation, and stability. As shown above, climate change affects food production, and thus food availability. There is less clarity, however, on the impacts of climate change on **nutrition**. Studies point to potential changes in the nutritional quality of some foods due to elevated CO<sub>2</sub>, particularly flour from major cereals and cassava. Climate change has been found to affect food safety, particularly on incidence and prevalence of food-borne diseases. (FAO, 2015).

As a result of climate change globally, the world is at greater risk of both floods and **severe droughts** affecting the availability of water which impacts human health, animal health, survival, food and security; it has also displaced people from their homes, potentially creating a refugee crisis in some countries. It is estimated there will be 200 million “climate refugees” by 2050, unless action against climate takes place now. Most of these refugees become displaced in their own countries, however, if the problem continues it could impact on the rest of the world (IOM, 2008).

In the UK, the government has a clear role in the regulation and management of water. The Environment Agency (EA) is responsible for water and this includes maintaining and improving the quality of fresh, marine, surface and underground water in England and Wales. The Drinking Water Inspectorate (DWI) is responsible for the quality of drinking water in England and Wales.

#### The local picture:

Tower Hamlets council has committed to maintaining a high standard of **water quality** in the borough by monitoring the environment, controlling pollution, giving advice and taking action where necessary to ensure the water supplied to residents is of the highest quality possible.

**Food poverty** is the inability to afford, or to have access to, food to make up a healthy diet. The main cause of food poverty is lack of money and resources. The food environment can also be a risk factor for food poverty. Local data from August 2024 shows that of the **30,184** low income households in Tower Hamlets identified by our Low-Income Family Tracker, **4,056** are living in food poverty (**13%** of all low income households). In addition, **2,478** children live in these food insecure households, representing **10%** of all low-income children in the borough. Added to this, **72%** of households in food poverty are also in fuel poverty (**2,909** households). Some groups are at greater risk of food poverty than others, including:

- Poorer, larger, younger families
- Single parents and their children
- Adults/older people who live alone
- People in the lowest income quintile/people who are unemployed
- People from a Black and Minority Ethnic background
- People who have a disability including those living with several mental illness
- People who are homeless or in temporary accommodation
- People with no recourse to public funds

As prices for food and basic necessities are increasing, it is expected that the number of food insecure households in the borough will rise significantly.

Food insecurity has been shown to be **linked to poor physical and mental health**. People on low incomes who are food insecure are more likely to have a poorer diet,

for example a higher consumption of sugar and saturated fatty acids, and lower intake of fruit, vegetables and dietary fibre, than recommended. A poor diet affects health. It increases the risk of obesity, hypertension, Type 2 Diabetes, heart disease and some cancers. Poor diet can also lead to low mood, depression and anxiety and can result in individuals being less able to fight off infections.

## **Mitigation measures and health benefits**

Climate change affects the production of food. Farming sustainably will ensure there is enough food for future generations. It is an additional step in fighting food insecurity.

Social protection programmes are essential in this effort, with proven effectiveness in breaking the vicious cycle of poverty and hunger. Social protection covers a wide array of instruments and objectives, encompassing both safety nets and “safety ropes”, i.e., mechanisms that enhance income-generating abilities and opportunities for the poor and vulnerable. Adequate, well-designed social protection would tackle some of the main vulnerabilities of households to climate risks. Income provided to the poor and hungry through social protection can enable them to access sufficient food to meet their basic nourishment needs, without compromising the future productivity of their livelihoods (FAO, 2015).

Tower Hamlets Council supports food insecure households in a number of ways:

- Food Pantry Programme
- Holiday and Food Activities
- Free School Meals
- Cash-First approaches
- Cost Of Living Payments (provided through the Household Support Fund)
- Fruit and Vegetable Vouchers
- Warm hubs and energy saving packs

Reducing Food Waste - food waste presents a significant problem due to the volume of waste that is produced each year. In fact, in the UK alone, it's estimated that we throw away around 9.5 million tonnes of food waste annually. The vast majority of food waste ends up in a landfills. While many people do not view this as an issue as food items degrade naturally over time, food production requires energy and water and producing more than is needed generates unnecessary emissions and wastes water.

Food waste also releases a great deal of methane gas as it breaks down. According to a report by the EPA, methane is 25 times more harmful than carbon dioxide because it can trap heat within the atmosphere (EPA, 2022b). Food is wasted mainly because of inefficient preparation, bumpy or bad roads, over-selective customers, and inadequate storage facilities. If storage facilities are improved and only food that is needed is prepared, less food would be wasted.

**Urban Food Growing** - responding to food systems challenges requires changing how people who live in cities eat. Urban agriculture is a nature-based solution that can provide fresh and healthy foods to urban dwellers and contribute to climate change mitigation and adaptation. The understanding of the local context in which it is being implemented is crucial to deal with uncertainties and maximize its benefits.

To give one example, a study in São Paulo, Brazil, showed that enhanced urban agriculture could supply all 21 million residents of the city with vegetables while generating more than 180,000 jobs – reducing poverty and inequity, improving nutrition, increasing well-being and generating livelihoods (UN Environment Programme, 2022). However, more research is needed to fully understand the effectiveness of urban agriculture and the policy actions needed to tap its potential. Local contexts need to be considered, while diverse forms of urban agriculture must be integrated into a portfolio of approaches that cover land-based and vertical farming, poultry and fish-farming, and high-tech indoor techniques.

According to the FAO (2019) sustainable healthy diets are dietary patterns that promote all dimensions of individuals' health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable.

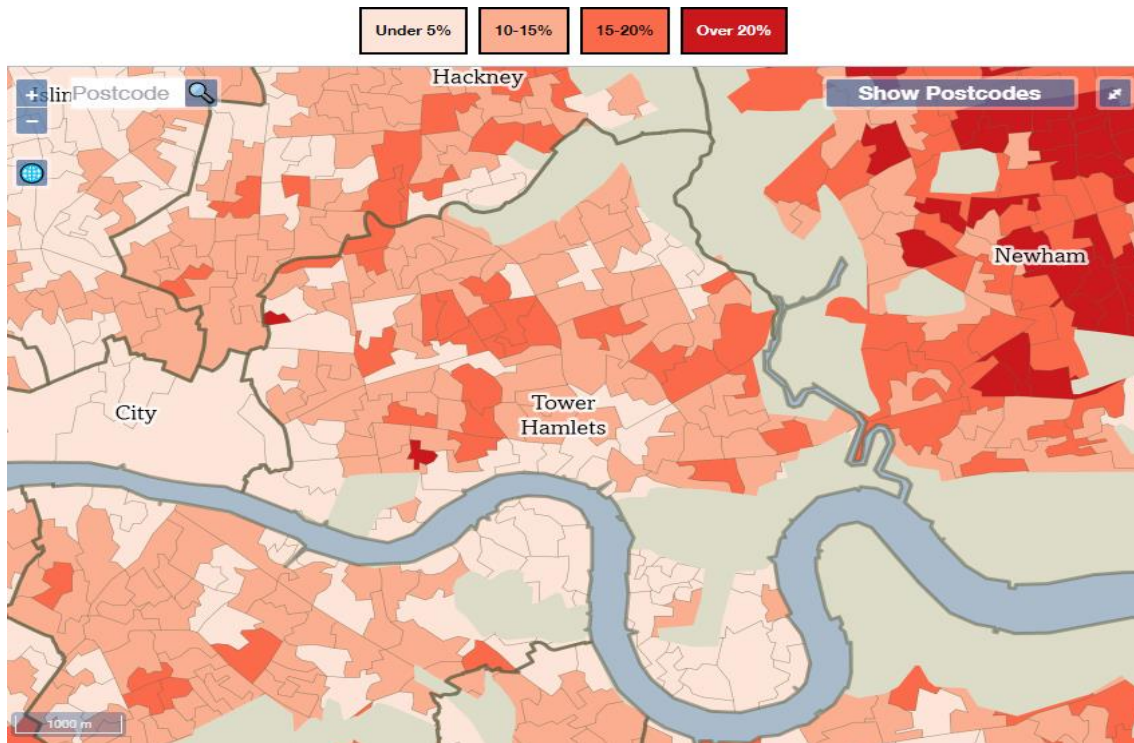
A study by Laine et.al. (2021) has found co-benefits in terms of both health outcomes and reduction of greenhouse gas emissions and land use from shifting to a universally sustainable diet.

## 7. Energy Efficiency

Mitigating and adapting to climate change are key challenges of the 21st century. At the core of these is the question of energy, more precisely, overall energy consumption and dependence on fossil fuels. To limit global warming, the world urgently needs to use energy efficiently while embracing clean energy sources. Globally, the use of energy represents by far the largest source of greenhouse gas emissions from human activities. About two thirds of global greenhouse gas emissions are linked to burning fossil fuels for energy to be used for heating, electricity, transport and industry. Our use and production of energy have a massive impact on the climate and the converse is also increasingly true. Climate change can alter our energy generation potential and energy needs. For example, changes to the water cycle have an impact on hydropower, and warmer temperatures increase the energy demand for cooling in the summer, while decreasing the demand for heating in the winter (EEA, 2017; IEA, 2019).

### The local picture

A household in England is defined as being in fuel poverty if it is in a property rated D or worse for energy efficiency and its disposable income (income after housing and energy costs) would be below the poverty line (60% of the national median income). This is known as the Low Income Low Energy Efficiency (LILEE) metric. According to the ONS (ONS, 2022), Tower Hamlets has the **highest median energy efficiency score** of all Local Authorities in the UK, 77, equivalent to band C.



**Figure 7: Proportion of Tower Hamlets households in fuel poverty in 2020.** The key shows that darker the colour, the higher the level of fuel poverty.

That said, 27% of residential properties are in band D or below (UK Gov, 2023) and 3.1% of properties don't even have central heating (UK Census, 2021.) The rapid rise in costs of gas and electricity in the UK means that a large number of properties are likely move into fuel poverty soon (Trust for London, 2022). Of the **30,184** low-income households identified by the Low-Income Family Tracker in August 2024, **10,637 are living in fuel poverty (35% of all low-income households).** **14,573** children live in these food insecure households, representing **59%** of all low-income children in the borough.

## Mitigation measures and health benefits

Improving **domestic energy efficiency** is vital to tackling climate change, and this is closely related to the issue of ensuring residents are warm and safe in their homes. However, installing and using low carbon heating and electricity can be expensive. It is therefore essential to ensure that such measures to avoid the health impacts associated with cold, damp homes do not leave vulnerable residents behind.

It is important that **vulnerable residents** have access to affordable warmth and green technology without suffering financial hardship.

Energy efficiency delivers a number of environmental benefits. It notably reduces GHG emissions, both direct emissions from fossil fuel combustion or consumption, and indirect emissions reductions from electricity generation.

Energy efficiency has a central role in tackling climate change, a task made all the more urgent by the recent rise in emissions and the limited time to achieve mitigation targets, as outlined by the recent Intergovernmental Panel on Climate Change (IPCC) special report on Global Warming of 1.5 Celsius. Energy efficiency is one of



the key ways the world can meet energy service demand with lower energy use, which is crucial in most of the IPCC GHG emissions pathways limiting global warming to 1.5 Celsius (IPCC, 2018).

Improving the energy efficiency of homes would reduce emissions from heating systems, which would have the additional benefits of:

- Reducing fuel bills, thus reducing fuel poverty and ill-health associated with living in cold environments
- Reduces likelihood of damp and mould occurring, which aggravate respiratory disease

## 8. Conclusion

Climate change is a public health issue and addressing it as such means developing measures that address both health and climate change (such as urban greening or active travel).

Climate Change has a detrimental impact on health and wellbeing, especially for vulnerable populations. This impact is due to the environment we live in changing: weather patterns, air pollution, an unstable food supply system and loss of green space. Mitigation measures must consider the most vulnerable populations to ensure that extra support is being offered to avoid a disproportionate health burden.

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<sup>i</sup> <https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2016>