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Building Climate Resilient Cities:

Youth Perspectives and Practices

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WHAT IS URBAN CLIMATE RESILIENCE?

Urban Climate Resilience (UCR) is the ability and capacity of cities, their systems, institutions, communities, and infrastructure, to cope with, adapt to, and recover from climate-induced shocks and wider impacts of climate change, whilst taking measures to prevent these impacts from worsening. It is increasingly critical as cities face rising exposure to climate risks, rapid urbanization, and multidimensional vulnerabilities. Youth are particularly relevant in this context: as the generation that will live longest with the consequences of climate change, they are disproportionately affected over time, yet they also represent a significant and often under-utilised force for innovation, social mobilisation, and long-term resilience building in cities.

UCR is a proactive approach that requires system-wide action, involving all members and levels of society. The goal is to minimise disruptions and ensure that essential urban services continue to function despite changing climate conditions. It includes both mitigation and adaptation strategies, ranging from local community and grassroots action, including youth-led initiatives, to national and international policy and treaties.

Key components of UCR:

- **Infrastructure Resilience**: The design, construction, and maintenance of urban infrastructure to withstand and recover from climatic events.
- **Social Resilience**: Building community preparedness, cohesion, and support systems, especially for poor and vulnerable populations, so that people have the resources and networks to respond to and recover from climate events. This is the adaptive capacity of communities.
- **Governance and Policy Resilience**: Ensuring that institutional structures and policies integrate climate risks into planning, budgeting, and decision-making in an inclusive and holistic way.

These components are essential for ensuring the continuity of urban services and economic resilience in the face of climate change, and for preventing the emergence of new cycles of poverty, particularly among vulnerable populations.[1 94 95]

Vulnerable communities:

Vulnerable communities face higher exposure and greater sensitivity to climate change while having more limited capacity and resources to prepare for, adapt to, and recover from climate-related impacts. These disproportionate effects stem from physical (built and environmental), social, political, and economic factors that are further intensified by climate stressors.[2]

Climate justice is essential to UCR. Resilience must prioritize those most exposed to harm and least able to cope, ensuring that adaptation reduces, not reinforces, inequality. A resilient city is one where systems endure shocks, all communities and people are protected, and institutions and services are able to withstand inevitable changes.

INTRODUCTION

Climate change is increasingly reshaping the daily realities of Europe's cities, exposing urban populations to intensifying heatwaves, floods, droughts, and other climate-related stresses. While these impacts affect all residents, young people are uniquely positioned within this crisis: they are among those who will live longest with its consequences, yet they remain underrepresented in many urban climate decision-making processes. At the same time, youth across Europe are emerging as critical actors in shaping urban climate resilience, not only as advocates demanding action, but as planners, innovators, educators, and community organizers actively contributing to adaptation solutions.

Urban climate resilience is therefore not only a question of infrastructure, governance, or technology; it is also a question of intergenerational justice, participation, and empowerment. Young people bring perspectives rooted in lived experience of cities, strong awareness of social and environmental inequities, and a long-term outlook that is essential for sustainable adaptation planning. From co-designing green public spaces and mobilizing communities during heatwaves, to contributing digital tools, research, and policy proposals, youth engagement is increasingly shaping how European cities respond to climate risks.

This report places youth engagement at the centre of urban climate resilience. It aims to demonstrate why meaningful youth participation is essential for effective, just, and durable adaptation outcomes, and how European cities and institutions are beginning to recognize and operationalize this role. The report begins by outlining the concept of urban climate resilience and the climate risks facing European cities, highlighting how these risks intersect with social vulnerability and climate justice. It then examines existing adaptation strategies at European, national, and local levels, with particular attention to participatory governance, nature-based solutions, and community-led initiatives. A central focus is placed on youth perspectives, priorities, and concrete contributions to urban climate resilience, illustrated through case studies, youth-led projects, and partnerships between young people and municipal governments. By bringing together policy frameworks, empirical evidence, and examples of practice, this report seeks to show that youth are not merely future stakeholders in climate resilience, but present-day co-creators of resilient urban futures.

This report is a desk-based knowledge compilation that brings together existing research, policy frameworks, and practice-based examples related to youth engagement in urban climate resilience (UCR) in Europe. The analysis draws on a review of European Union policy documents, academic literature, reports from international organisations, city networks, and civil society actors, as well as documented examples of youth-led and youth-inclusive initiatives.

The examples included are not intended to be statistically representative of all European cities or youth experiences. Rather, they are illustrative, highlighting recurring themes, emerging practices,

and promising approaches that reflect broader trends identified in the literature and policy landscape. This framing clarifies both the strengths and limitations of the compilation and provides context for interpreting the findings presented throughout the report.

1.

Urban Climate Risks and Impacts in Europe

Climate change is already disrupting urban areas across Europe, and cities are on the front line of climate risks. Europe's population is highly urbanized, with approximately 74.8% of Europeans living in urban areas as of 2021[3]. Urban communities are experiencing rising temperatures, changing precipitation patterns, and more frequent extreme weather events due to global warming[4,5] and Europe has warmed faster than the global average in recent decades.[5] Cities are especially vulnerable because of their high population densities, dense infrastructure, and limited green space, which combined amplify climate hazards and increase exposure and vulnerability to them[5].

Climate risk is determined by the interplay of climate hazards (such as heatwaves, droughts, or floods), the exposure of people and physical assets to these hazards, and their vulnerability or ability to cope. In Europe's urban areas, all three components of risk can be high: powerful hazards are striking more frequently, a large and growing urban population is exposed, and vulnerable groups often lack protection or resources.[4,5]

Key Climate Hazards in Urban Areas

Climate change is intensifying hazards that affect European cities. The most pressing climate-related hazards for urban areas include extreme heat, heavy precipitation and flooding, drought and water scarcity, and other threats such as coastal storms and wildfires. Local authorities across Europe most frequently identify temperature extremes and precipitation variability as their primary climate concerns.[5] [6] While each hazard has distinct impacts, they are often interdependent. For example, drought can increase heat stress and wildfire risk, while heavy rainfall on impervious urban surfaces can lead to flash floods. Below is an overview of the major climate hazards facing Europe's cities and their impacts.

Extreme Heat and Urban Heatwaves

Extreme heat is the deadliest climate hazard in Europe's urban areas. Heatwaves have caused over 85% of all climate-related disaster fatalities in Europe in recent decades.[5] Notably, the 2003 pan-European heatwave alone was responsible for tens of thousands of deaths, and heatwaves in the 2010s and 2020s have continued to break temperature records and lead to heat-related mortality crises in cities.[7] Across the continent, average temperatures are rising, and extreme hot days have become more frequent and intense due to human-induced climate change[4] [10]. Urban areas experience these temperature extremes especially acutely because of the urban heat island (UHI) effect, the tendency for cities with dense buildings and paved surfaces to retain heat. In city centers and built-up neighborhoods, surface temperatures can be 10–15°C hotter than in surrounding rural areas during heatwaves.[5] Such conditions dramatically increase the risk of heat exhaustion, heat stroke, and mortality, particularly for the elderly and those with pre-existing health conditions. For example, during the summer 2022 heatwaves, European cities saw a sharp spike in heat-related deaths; estimates suggest that over 60,000 people in Europe died from heat-related causes in that single summer.[9]

Heatwaves also exacerbate urban air pollution (such as ozone formation) and strain energy systems due to surging demand for cooling.[10] [12] Many cities in southern Europe regularly experience summer daytime highs well above 40°C, and even traditionally cooler northern cities have faced unprecedented heat. For instance, all-time high temperatures were recorded in parts of Scandinavia and the UK in recent heatwaves.[4] [13] Climate projections indicate that heatwaves will become longer, more frequent, and more intense in coming decades under all emissions scenarios, which poses a severe risk to urban populations.[4] [10] By 2050, what is currently a 1-in-10 year hot extreme could occur almost every other year in much of Europe, especially in southern and central Europe[4] [14]. The combination of a warming climate and an ageing urban population means heat-related health risks are accelerating, each decade, a greater number of elderly in Europe are exposed to heatwaves, and without strong adaptation measures, heat mortality is projected to rise further.[7]

Heavy Rainfall and Urban Flooding

Cities are highly vulnerable to heavy rainfall and the flooding it causes. Climate change is increasing the intensity of downpours in many parts of Europe, leading to more frequent flash floods, river flooding, and sewer overflows in urban areas.[8] [15] Urban flooding is especially damaging because cities are dominated by hard surfaces such as roads and buildings, which prevent rainwater from soaking into the ground. As a result, water can accumulate rapidly in streets and basements during intense rainfall. On average, around 10% of Europe's urban areas are already exposed to flood risk, and recent events, such as the catastrophic floods in Germany, Belgium, and the Netherlands in 2021, show how deadly and costly such events can be.[4] [12]

Flood risk in cities is further intensified by land-use patterns and aging infrastructure. Urban development has increasingly expanded into flood-prone areas, increasing the exposure of homes, businesses, and transport networks.[16] At the same time, many cities rely on older drainage systems that were not designed to handle today's heavier rainfall, leading to frequent surface flooding and sewer backups. Climate projections indicate that extreme rainfall is likely to increase further in northern and western Europe, while southern regions may experience more intense rainfall events even as overall precipitation declines, raising the risk of flash floods across much of the continent.[4] [12] The impacts of urban flooding are severe, including damage to buildings and infrastructure, disruption to transport and power supply, threats to human safety, and large economic losses, which have accumulated to hundreds of billions of euros across Europe in recent decades.[13]

Coastal flooding represents an additional and growing risk for many European cities located along coastlines and estuaries. Rising sea levels and storm surges are already increasing the frequency of coastal flooding in low-lying urban areas.[19] While flood defences have historically protected many coastal cities, continued sea-level rise is expected to increase the pressure on these systems and raise the likelihood of flooding in the coming decades.[12] In some locations, flooding risks are compounded when storm surges coincide with heavy rainfall, overwhelming drainage and river systems. Cities such as Venice illustrate the growing challenge of managing coastal flood risks, prompting investments in barriers and nature-based solutions, yet safeguarding Europe's urban coastlines will require sustained adaptation efforts as climate risks continue to intensify.[8]

Droughts and Water Scarcity

Another major climate risk to European cities is drought and the associated problem of water scarcity. Climate change is altering precipitation patterns, leading to drier conditions especially in southern and southeastern Europe. In recent summers, severe droughts have affected wide swathes of the continent. 2022, for example, was one of the driest years on record in Europe, with rivers like the Rhine and Po reaching record low levels. Urban areas depend on steady water supply for drinking water, sanitation, industry, and green space irrigation. Prolonged droughts reduce water availability for cities, potentially forcing water use restrictions and threatening the

functioning of power plants or factories that need cooling water.[17] [18] Many Mediterranean cities (in Spain, Italy, Greece, Cyprus, etc.) have already experienced water shortages during summer droughts, and climate models project a further decrease in summer rainfall and runoff in southern Europe by 2050.[4] [8] [10] Even parts of western and central Europe, such as France and Germany, have faced multi-year rainfall deficits recently, highlighting that drought is not solely a southern issue.

In urban areas, water scarcity can lead to difficult trade-offs in water usage (prioritizing essential domestic supply over parks or industry), and can degrade water quality as lower river flows concentrate pollutants. The European Environment Agency (2024) noted that water supply, public health, and infrastructure are among the sectors most impacted by climate change in cities, with droughts contributing to reduced water quality and quantity. Furthermore, drought conditions can harm urban green spaces and biodiversity, making cities more susceptible to heat (since dry soil and vegetation provide less cooling). Some cities, like Barcelona, have built desalination plants and water recycling systems as adaptation measures, but not all municipalities have the resources for such investments. Droughts also can indirectly impact cities by threatening food supply chains and increasing food prices, since agriculture around Europe is strained by water shortages.[5] Overall, drought and water scarcity represent a quieter but significant climate risk for Europe's cities, one that is expected to intensify particularly in the Mediterranean and continental interior regions.

Storms

European cities also face other major climate-related hazards, including storms, wildfires, and climate-sensitive health risks. Windstorms remain one of Europe's most damaging natural hazards, regularly affecting buildings, transport systems, and power infrastructure. Europe's past severe windstorms have resulted in extensive damage to infrastructure and prolonged power outages across large regions, highlighting the vulnerability of urban areas to such events.[18] Although future projections for wind extremes are more uncertain than for temperature or precipitation, scientific assessments conclude that Europe will continue to experience severe winter storms capable of disrupting energy networks, transportation, and urban infrastructure.[4] [10] [18] Strengthening buildings and critical infrastructure to withstand high winds therefore remains an important adaptation priority, particularly in western and northern Europe where extratropical cyclones occur most frequently. [18] [20]

Wildfires

Wildfires are primarily associated with forested and rural areas, but the expansion of the wildland–urban interface in Europe is increasing the exposure of communities near urban edges.[11] [14] During hot, dry summers, fire-prone conditions raise the likelihood of fires affecting areas close to towns and suburbs, threatening properties and human safety.[19] [14] [21] Even when fires do not reach city limits, smoke can travel long distances, affecting air quality and posing health risks for urban populations.[15] Climate change has already contributed to longer and more severe wildfire seasons in Europe, expanding regions exposed to high fire danger and increasing risks for communities

adjacent to forests and dry vegetation.[19] [14] Consequently, cities are increasingly integrating wildfire risk into land-use planning, fire management, and emergency response strategies for neighbourhoods near natural areas.

The Spreading of Climate-sensitive Diseases

A growing concern in European cities is the spread of climate-sensitive diseases and related health risks. Warmer temperatures and changing rainfall are affecting the geographic range of disease vectors like mosquitoes and ticks. Southern Europe is now warm enough to sustain mosquitos that carry formerly tropical diseases such as dengue and chikungunya, with several local outbreaks recorded in recent years.[5] Similarly, tick-borne diseases (e.g. Lyme disease, tick-borne encephalitis) are increasing and moving northwards as milder climates improve tick survival.[5] Urban areas, with high human densities, can be focal points for the spread of such diseases if the vectors establish themselves in and around cities (for instance, *Aedes* mosquitos breeding in water containers). Heatwaves and drought can also increase risks of food and water-borne illnesses (due to bacterial growth or water shortages impacting sanitation). Thus, climate change poses new public health challenges for city authorities, requiring enhanced surveillance for vector-borne diseases, upgrading water infrastructure, and ensuring healthcare systems are prepared for climate-related health emergencies.

In summary, Europe's urban areas face a complex spectrum of climate hazards. While extreme heat, flooding, and drought stand out as top priorities, cities must also brace for storms, wildfires, and health threats exacerbated by climate change. Critically, these hazards can produce cascading impacts: for example, an extreme storm can knock out power and transport, impeding emergency responses, or a wildfire can degrade air quality and overwhelm hospitals while also causing economic losses.

Climate risks in cities are often interconnected, meaning a shock in one system (like the power grid) can ripple into others (transport, healthcare, water supply).[5] **This underscores the need for integrated climate resilience planning.** The next section examines how these hazards translate into concrete impacts on urban society and infrastructure, and which sectors are most at risk.

Impacts on Urban Sectors and Systems

Climate hazards are already impacting a wide range of urban sectors and systems in Europe. According to the European Environment Agency, the water supply, buildings, human health, and transport sectors are reported to be most affected by climate change in urban areas.[5] However, virtually all aspects of city life, including energy networks, ecosystems, and the economy, feel the strain of climate-related stressors. This section outlines the key impacts observed and expected in major sectors:

- **Water and Sanitation:** Reliable water supply is essential for cities, yet both droughts and floods increasingly threaten urban water systems. Climate change is intensifying droughts

and reducing water availability in many European regions, placing pressure on reservoirs, aquifers, and freshwater sources needed for drinking water, sanitation, and essential services.[21] At the same time, heavy rainfall and flooding can overwhelm sewer and drainage systems, particularly where combined sewers carry stormwater and wastewater together, leading to untreated discharges and contamination of water bodies.[15] [22] Flooding often degrades water quality, increasing risks of waterborne disease and placing additional strain on drinking water treatment. Urban water utilities therefore face growing challenges from both water scarcity and excess. Addressing these pressures requires investments in storage capacity, distribution efficiency, flood protection, and diversified water sources, including reuse and other adaptive measures. **In sum, climate change is placing Europe's urban water and sanitation systems under dual stress from increasing drought and flooding, making resilient water management essential for public health and basic urban functioning.**

- **Buildings and the Urban Built Environment:** Buildings—homes, schools, hospitals, and workplaces—are central to urban life and increasingly exposed to climate extremes. Heatwaves are making it harder to maintain safe and comfortable indoor temperatures, particularly in buildings designed for historically moderate climates and lacking adequate insulation or cooling. Overheating raises health risks and reduces productivity, especially in vulnerable housing.[15] Extreme weather events such as storms and floods also cause direct physical damage, including roof and window failures, water intrusion, and destruction of electrical and mechanical systems. Housing in flood-prone areas faces heightened risks to safety and habitability.[23]Critical facilities are particularly exposed: around 10% of schools and 11% of hospitals in Europe are located in flood-prone zones, and nearly half of those in cities are situated in urban heat island hotspots.[13] [8] Poorly adapted buildings can therefore intensify health risks and disrupt essential services during climate extremes.[5] **In sum, Europe's building stock, much of it not designed for today's climate extremes, has become a key vulnerability, with risks to health, safety, and the continuity of essential services increasing as heatwaves, storms, and floods intensify.**
- **Transport Infrastructure:** Urban transport systems—including roads, railways, metro systems, and airports—are highly sensitive to extreme weather. Flooding can submerge roads and tunnels, damage bridges and rail tracks, and disrupt metro services, while heavy rainfall frequently overwhelms drainage systems.[5] [16] [11] Extreme heat also affects transport performance, causing rail tracks to expand and buckle and asphalt roads to soften, leading to speed restrictions and costly repairs.[5] [11] Inland waterways used for freight are increasingly affected by low river levels during droughts, constraining navigation and commerce. Disruptions to transport have significant economic and social consequences, affecting commuting, supply chains, and emergency response. Adaptation measures include enhanced drainage, elevation or waterproofing of critical infrastructure, heat-resistant construction materials, and robust emergency management planning. **In sum, climate extremes increasingly disrupt urban transport systems, with knock-on economic and social impacts that highlight the need for climate-resilient design, maintenance, and emergency planning across all modes of transport.**

- **Energy and Telecommunications:** Energy and digital systems underpin all urban functions and are increasingly affected by climate change. Heatwaves drive sharp increases in electricity demand due to cooling needs, stressing power grids and increasing the risk of supply shortages and higher prices.[24] High temperatures and reduced water availability can also lower the efficiency of power plants, including hydropower and thermal generation, particularly in southern Europe.[5] [15] Storms, floods, and heat can physically damage energy infrastructure, while telecommunications networks and data centres are similarly vulnerable to extreme events. Disruptions to these systems can rapidly affect other urban services that depend on power and connectivity. Urban resilience planning therefore increasingly focuses on backup systems, diversified and local energy sources, storage for critical services, and stronger design standards for essential infrastructure.[4] **In sum, climate impacts on energy and digital systems pose systemic risks for cities, as failures in these interconnected networks can quickly cascade across critical services and amplify the consequences of extreme weather.**
- **Public Health:** Climate change directly and indirectly affects the health of urban populations. Heatwaves increase heat stress, dehydration, heat stroke, and excess mortality, particularly among older adults, while also exacerbating cardiovascular and respiratory conditions and worsening air quality. Floods and storms cause injuries, displacement, and long-term mental health impacts, including trauma and post-traumatic stress. Climate-driven changes in disease vectors raise the risk of infections such as dengue, West Nile fever, and Lyme disease in urban areas.[5] Mental health impacts—including climate anxiety—are increasingly observed, particularly among young people.[25] Health systems themselves are vulnerable, as hospitals may be affected by heat or flooding precisely when demand for care peaks. The WHO Europe office warns that climate change is already increasing multiple health burdens and calls for strengthened, climate-resilient health systems.[23] **In sum, urban public health is a central concern in climate impacts, and it interlinks with other sectors: healthy, resilient populations depend on reliable infrastructure, housing, and services.**
- **Urban Economy and Society:** Climate risks increasingly threaten the economic vitality and social fabric of Europe's cities. Extreme events cause direct damage to buildings and infrastructure while also disrupting business activity, labour productivity, and public finances. Weather- and climate-related hazards have caused hundreds of billions of euros in economic losses across Europe since 1980, with recent years among the most costly.[24] A single season of heatwaves, droughts, and floods in 2024 is estimated to have generated tens of billions of euros in losses, with much higher cumulative costs projected if risks remain unmanaged.[24] Heat stress alone has been shown to reduce economic output, further amplifying losses. At the same time, climate challenges are driving innovation, cooperation, and community action, with cities sharing knowledge through networks such as ICLEI and Eurocities and local communities mobilising mutual support during crises.[26] **In sum, climate change threatens the economic vitality and social cohesion of Europe's cities, making resilience-building not only an environmental priority but also a fundamental economic and societal necessity.**

Key Takeaways: Urban Climate Risks and Impacts in Europe

- **European cities are at the frontline of climate change,** with nearly three-quarters of the population living in urban areas that concentrate people, infrastructure, and economic activity, amplifying exposure to climate hazards.

- **Urban climate risk results from the interaction of hazards, exposure, and vulnerability**, all of which are high in European cities due to more frequent extreme events, dense urban development, and social inequalities that limit adaptive capacity.

- **Extreme heat is the most lethal climate hazard for cities, driven by rising temperatures and the urban heat island effect**, with heatwaves already causing tens of thousands of deaths and projected to intensify sharply in frequency and severity.

- **Flooding risks are increasing due to heavier rainfall, land-use patterns, and ageing infrastructure**, causing widespread damage to buildings, transport, and utilities, with coastal cities facing additional threats from sea-level rise and storm surges.

- **Drought and water scarcity pose growing risks to urban water security,** particularly in southern and central Europe, affecting drinking water supply, sanitation, energy production, green spaces, and food systems.

- **Cities face compound and cascading climate risks,** where one hazard (e.g. storms or floods) can trigger failures across interconnected systems such as energy, transport, healthcare, and communications.

- **Climate change is already disrupting all major urban sectors**, including water and sanitation, buildings, transport, energy, public health, and the urban economy, threatening the continuity of essential services.

- **Public health impacts are escalating,** ranging from heat-related mortality and worsening air quality to the spread of climate-sensitive diseases and increasing mental health burdens, particularly among vulnerable populations.

- **Economic and social impacts are substantial and rising, with climate-related disasters causing hundreds of billions of euros in losses,** reducing productivity, straining public

finances, and threatening social cohesion in cities.

- **Integrated urban climate resilience planning is essential**, as addressing individual hazards in isolation is insufficient given the interconnected nature of urban systems and the scale of projected climate impacts.

Climate Justice and Vulnerable Communities in Urban Climate Risk

Climate change impacts in cities do not affect all residents equally. Climate justice is an increasingly important lens for understanding urban climate risks in Europe. It highlights the disproportionate burden of climate hazards on certain vulnerable and marginalized groups, and the need for equitable adaptation solutions that "leave no one behind". Broadly recognised in the literature, vulnerable groups in the urban context include the elderly, children, people with health conditions or disabilities, low-income households, minority and migrant communities, and those living in precarious conditions.[4] [27] These groups often have higher exposure or higher sensitivity to climate hazards, and fewer resources to cope and adapt. In this section, we detail the impacts of urban climate risks on such groups in Europe and discuss the principles of climate justice that must guide urban adaptation.

The elderly (65+ years) are among the most at-risk in extreme heat events. The elderly are physiologically less able to regulate body temperature and often live alone or in housing without adequate cooling. Europe's population is ageing, the proportion of people aged 65+ in the EU is projected to rise from about 20% in 2019 to over 30% by 2100.[28] This demographic shift, combined with rising temperatures, has already led to a significant increase in heatwave exposure for seniors.[12] Older people are far more likely to suffer and die during heatwaves than the general population.[10] Furthermore, a significant concern is that nearly half of urban hospitals and care facilities are located in areas with strong urban heat island effects,[12] meaning that the very places meant to care for the elderly (and ill) are themselves in hot zones. Similarly, about 11% of hospitals across Europe lie in potential flood zones,[13] posing risks to patients who cannot easily be moved and to the continuity of care. The World Health Organisation suggests protecting the elderly through targeted measures like cooling centers, community check-ins during heatwaves, resilient design for care homes, and ensuring evacuation plans account for those with limited mobility.[29]

Children (below 18 years) are widely recognised as a particularly vulnerable group to climate impacts because of their physiological and developmental characteristics, which make them less able to regulate body temperature and more susceptible to heat and dehydration.[30] Young children depend on caregivers for protection during extreme heat events, and infants and toddlers cannot efficiently cool themselves or maintain hydration during heatwaves.[30] There is also

evidence that climate-induced disasters such as floods and heatwaves can affect children's mental health, with anxiety, stress and distress documented following extreme events and in association with concerns about climate change.[30] Across European cities, many schools are located in areas affected by urban heat island effects, exposing pupils to higher temperatures, and around 10% of schools are in flood-prone areas, compounding risk from climate extremes.[30] Ensuring climate justice for children means providing safe environments that reduce their exposure to heat and flooding, preparing school infrastructure for extremes, and addressing the mental health dimension by offering appropriate support and reassurance about climate action.[30]

Low-income and socio-economically disadvantaged communities tend to be disproportionately affected by urban climate risks in Europe. There is a clear equity issue: those with the least resources often live in the highest-risk environments and have the fewest options to adapt. For example, poorer households often reside in substandard housing that might lack insulation, cooling, or stable construction. During heatwaves, these homes heat up more and offer less protection, yet low-income residents may not afford air conditioning or higher energy bills.[10] Indeed, data show that in nearly all European countries, the lowest income households are significantly less able to keep their homes cool in summer compared to higher-income households, often resorting to uncomfortable conditions because of cost. In some Southern European countries, the poorest are twice as likely to live in uncomfortably hot homes as the wealthiest.[12] During floods, lower-income neighbourhoods may lack robust flood defences or are situated in cheaper, more flood-prone areas because affordability and housing market dynamics push economically disadvantaged groups into higher-risk zones (where rents and property prices tend to be lower), meaning poorer households often face disproportionately severe flood exposure and impacts.[13] [8] A concrete example is the exposure of some Roma communities in Central and Eastern Europe, who often live in floodplain areas with limited infrastructure, resulting in disproportionate flood impacts on these ethnic minority groups.[31] Additionally, low-income residents typically have less access to insurance or savings, making it harder to recover from losses when a disaster strikes.[13] [8] **Climate justice in cities thus requires addressing these structural inequalities.** Without such efforts, adaptation measures could inadvertently widen disparities (e.g. if only wealthier areas get green parks and cooling, leaving poorer areas hotter.

Migrants and ethnic minorities are recognized as particularly vulnerable to climate hazards in Europe. Many migrants, including recent immigrants, refugees, and asylum seekers, face language barriers, social exclusion, and precarious housing, all of which increase their exposure and reduce their capacity to cope during extreme events.[5] Outdoor workers, a group disproportionately composed of migrants and ethnic minorities, are at higher risk of heat exposure due to their occupational conditions.[5] [32] Language barriers and limited access to official communication channels can prevent migrants from receiving timely warnings or understanding protective measures, further heightening their vulnerability.[12] Climate justice frameworks emphasize the importance of inclusive adaptation planning, ensuring that warnings, resources, and decision-making processes are accessible to all linguistic and cultural communities.[33] Some European cities have begun implementing community liaison programs to engage migrant leaders in emergency planning, reflecting a step toward the recognition and procedural justice principles of climate justice, which value and incorporate diverse perspectives.[33]

Another group to consider are those with **pre-existing health issues or disabilities**. People who are immunocompromised, have chronic illnesses, or live with disabilities can be extremely vulnerable during climate events.[10] Power outages endanger people who depend on electrically powered medical devices, such as ventilators, dialysis machines, or refrigerated medications, by disrupting their access to essential life-supporting equipment Additionally, persons with mobility impairments may face serious challenges during evacuations from floods or other disasters, as inaccessible infrastructure can prevent timely escape and increase the risk of harm.[34] Effective adaptation measures must therefore anticipate these needs, e.g., providing backup power for medical equipment, targeted evacuation assistance, and prioritizing these individuals in emergency response. Many cities are now mapping social vulnerabilities (using heat vulnerability indices, etc.) to identify where such populations are concentrated and to guide resource allocation.[35]

In light of these disparities, the concept of "just resilience" has gained traction in Europe. **Just resilience refers to adaptation approaches that aim to prevent climate action from reinforcing existing social inequalities and to ensure that vulnerable groups benefit fairly from adaptation measures rather than being left behind.**[12] [13] Evidence shows that current adaptation efforts do not automatically benefit all groups equally: across European cities, neighbourhoods with lower socio-economic status tend to have less, and lower quality, green space, meaning they are more exposed to heat and gain fewer cooling benefits from greening initiatives than more affluent areas.[12] [13] Similarly, decisions about where to locate flood defences are often based on cost-benefit analyses that do not consider how flood impacts are distributed across populations, potentially leaving low-income housing areas less protected.[12] [13] To achieve climate justice, adaptation planning needs to incorporate equity considerations at every stage, from planning to implementation and monitoring, and ensure meaningful engagement of vulnerable groups in decision-making. The principles of climate justice, distributive justice (fair allocation of adaptation benefits and burdens), procedural justice (inclusive participation), and recognition (respect for diverse perspectives), are foundational to this approach.[12] [13]

In conclusion, climate change is not just an environmental or technical challenge for Europe's cities; it is fundamentally a human and social challenge. **Recognizing and addressing the disproportionate impacts on children, the elderly, the poor, migrants, and other marginalized groups is critical for any effective climate risk response. A climate-resilient city must also be an equitable city. By pursuing "just resilience", European cities can ensure that adaptation efforts protect the most vulnerable, empower communities, and create a safer, fairer future for all urban residents**. This means prioritizing inclusive planning and community engagement, allocating adaptation investments to where they are needed most, and continuously evaluating who benefits, and who doesn't, from climate actions. As the climate continues to change, the cities that succeed will not only be those that build higher flood walls or plant more trees, but those that bring their entire community along, protecting livelihoods and dignity while combating climate risks. **Climate justice is thus both an ethical obligation and a practical necessity to strengthen the overall resilience of Europe's urban society against the climate threats of today and tomorrow.**

Although climate risks affect cities across Europe, some regions face particularly acute vulnerabilities due to the combination of high hazard exposure and limited adaptive capacity. The European Climate Risk Assessment highlights **Southern Europe** as facing elevated risks from heat, drought, wildfires, and water scarcity, and identifies **low-lying coastal areas** as particularly exposed to sea-level rise, coastal flooding, erosion, and saltwater intrusion.[5] Southern European cities already experience frequent extreme heat and water stress, pressures that are projected to intensify under climate change. Urban characteristics such as dense built environments, limited green space, and ageing building stock further exacerbate heat risks. Indicator-based assessments consistently rank many Southern European cities as having medium-high to high vulnerability to multiple climate hazards.[36]

Low-lying coastal cities face compounding climate risks that threaten housing, transport networks, ports, and other critical infrastructure. While some cities benefit from advanced flood defences, maintaining protection requires sustained investment, and failures can lead to severe disruption. The EEA emphasises that coastal risks can also trigger cascading economic impacts, particularly in cities dependent on ports and tourism.[5] Across Europe, differences in socio-economic conditions and infrastructure quality influence cities' capacity to cope with climate hazards, with some regions facing greater challenges due to limited resources and ageing infrastructure.

Ukraine: conflict-driven urban climate vulnerability

The war in Ukraine has drastically increased the climate vulnerability of its cities by simultaneously increasing exposure to climate hazards and reducing adaptive capacity. Widespread damage to energy, water, housing, and transport infrastructure has diminished cities' ability to cope with heatwaves, cold spells, floods, and droughts.[37] Repeated attacks on electricity and heating systems have left urban populations exposed to temperature extremes, while damage to water and wastewater infrastructure heightens risks from flooding and water contamination. The destruction of the Kakhovka dam in 2023 further illustrates how conflict-related damage can create long-term climate risks for urban water management and flood control in southern Ukraine.[37] At the same time, economic contraction, displacement, and institutional strain have severely limited resources for adaptation. As a result, Ukrainian cities now face greatly reduced capacity to manage climate risks, making them highly vulnerable to even moderate climate variability, let alone extreme events.

Identifying climate-vulnerable cities: indices and assessments

To systematically identify which European cities face the highest climate risks, researchers and institutions use vulnerability and resilience assessments that combine hazard exposure, sensitivity, and adaptive capacity. Researchers analysed 571 European cities for vulnerability to heatwaves, droughts, and floods.[36] The EEA's Urban Adaptation Map Viewer shows clear geographic patterns: many cities in Southern Spain, southern Italy, and south-eastern Europe fall into "medium-high" to

"high" vulnerability categories, while cities in Scandinavia and parts of Western Europe generally show lower vulnerability. Even wealthier cities contain pockets of vulnerability, demonstrating that high income alone does not eliminate climate risk.

At a broader level, the European Climate Risk Assessment (EUCRA) identifies Southern Europe and coastal areas as priority hotspots for adaptation, emphasising overlapping and compounding risks.[5] Heat-related mortality, economic disruptions, and gaps in adaptation planning illustrate that exposure often exceeds local capacity to respond.

Resilience rankings offer a complementary perspective. CBRE (2024) assessed 42 European cities and found that the **top 10 most climate-resilient were all in Northern and Western Europe: Amsterdam, London, Manchester, Birmingham, Gothenburg, Stockholm, Oslo, Helsinki, Paris, and Rotterdam**.[38] These cities combine lower hazard exposure with long-standing investments in planning and infrastructure. Many Southern and Eastern European cities rank lower, reflecting higher risks and less developed adaptation measures. Taken together, these assessments consistently indicate a regional pattern of vulnerability, reinforcing the need for targeted adaptation where exposure is highest and capacity is lowest.

Key Takeaways: Climate Justice and Vulnerable Communities

- **Integrating climate justice as a core principle of urban climate resilience** can help address the unequal distribution of climate risks and ensure adaptation efforts prioritise those most exposed and least able to cope.

- **Prioritising protection of the elderly in urban adaptation planning** is particularly important, including measures such as heat-action plans, cooling centres, community check-ins, resilient care facilities, and evacuation strategies that account for limited mobility and health needs.

- **Designing child-centred adaptation measures** can reduce climate risks for children, for example through climate-resilient school infrastructure, shaded and flood-safe public spaces, and mental-health support following climate-related disruptions.

- **Targeting adaptation investments toward low-income and socio-economically disadvantaged neighbourhoods** can help address structural inequalities in exposure to heat, flooding, and poor housing conditions, while supporting recovery capacity.

- **Ensuring adaptation policies do not inadvertently reinforce existing inequalities is critical**, particularly in relation to the distribution of green space, cooling measures, and flood protection.

- **Making climate risk communication and early warning systems inclusive and accessible** can improve protection for migrants, refugees, and ethnic minority communities by addressing language barriers and unequal access to information.

- **Accounting for the needs of people with disabilities and chronic health conditions in adaptation planning** can enhance safety during extreme events, for example through backup power for medical devices, accessible evacuation routes, and targeted emergency support.

- **Using social vulnerability mapping and disaggregated data** can support more informed adaptation decisions by helping cities identify high-risk populations and prioritise resources accordingly.

- **Adopting a "just resilience" approach throughout the adaptation cycle**, from planning to implementation and monitoring, can help embed distributive, procedural, and recognition justice in urban climate action.

- **Strengthening adaptation efforts in regions facing particularly high or compound risks**, such as Southern Europe, low-lying coastal cities, and conflict-affected urban areas, may be especially important where adaptive capacity is constrained.

- **Complementing technical adaptation measures with social and institutional support can improve outcomes,** recognising that infrastructure alone is insufficient without inclusive governance, sustained funding, and community engagement.

2.

EXISTING EUROPEAN URBAN CLIMATE ADAPTATION STRATEGIES:

Focus on Youth and Local Initiatives

The European Union's adaptation strategy 'Forging a Climate-Resilient Europe' underscores the urgency of climate-proofing cities and calls for integrating adaptation at all levels of governance.[39] In parallel, frameworks like the EU Mission on Adaptation to Climate Change aim to support at least 150 regions and communities in developing climate resilience by 2030, reflecting a multi-level effort bridging European, national, and local action.[40] Within these efforts, there is a growing recognition of the critical role of local initiatives and youth engagement. Young people, often among those most vulnerable to long-term climate impacts, are increasingly seen not just as stakeholders but as essential partners and innovators in adaptation.[48] This section examines key strategies for urban climate adaptation in Europe, ranging from governance mechanisms to green infrastructure and digital tools, with particular attention to youth involvement and grassroots, community-led initiatives.

Multi-Level Governance in Climate Adaptation

Effective urban climate adaptation in Europe requires coordination across multiple levels of governance, European, national, regional, and local. The EU provides overarching direction and support: for example, the EU Adaptation Strategy (2021) sets out common goals and encourages member states to develop national adaptation plans that empower cities and regions.[39] Likewise, the EU's Mission on Adaptation is fostering partnerships between the European Commission, national governments, and local authorities; this mission initiative has enrolled dozens of cities and regions as signatories to its charter, committing them to develop adaptation roadmaps with EU support.[40] These top-down frameworks are complemented by bottom-up city networks and initiatives. Transnational networks such as C40 Cities, ICLEI, and the Covenant of Mayors facilitate knowledge exchange and capacity-building, allowing municipalities to learn from each other and to amplify their voice in national and global policy dialogues.[41]

National governments play a crucial intermediary role. In many European countries, national climate adaptation strategies or laws provide mandates and guidance for cities to prepare local adaptation plans. Multi-level governance is not only about institutions but also about involving diverse stakeholders at each level. An emerging principle in climate governance is subsidiarity with support: meaning that decisions and implementation should occur at the most local level feasible, with higher levels providing financial support, technical expertise, and policy frameworks. The European Committee of the Regions has emphasized this approach, advocating for stronger vertical integration so that city-level adaptation plans are backed by national resources and aligned with EU objectives. Conversely, local experiences and innovations need to inform higher-level strategies, a feedback loop evident in how pioneering city practices have shaped national policies in countries like the Netherlands and Germany.[11]

Additionally, organisations such as the C40 Cities Climate Leadership Group argue that engaging the private sector and civil society through public–private partnerships is vital for scaling up urban resilience, and that national governments can play a key role in catalysing local innovation in this area.[41] In summary, multi-level governance frameworks in Europe are evolving to ensure that cities have the mandate, resources, and knowledge networks to adapt effectively, while also ensuring that grassroots initiatives and city-level experiences inform broader climate resilience policies.

Green Infrastructure and Nature-Based Solutions

Green infrastructure, often referred to as nature-based solutions (NBS), has become a cornerstone of urban climate adaptation in Europe. Nature-based solutions involve leveraging natural systems, such as parks, forests, wetlands, green roofs, and sustainable urban drainage, to mitigate climate risks while providing co-benefits like improved air quality, biodiversity habitat, and recreational space.[42] The European Commission defines NBS as "solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits, and help build resilience". In practice, this translates to measures like planting urban trees to reduce heat islands, restoring river floodplains to absorb floodwaters, and creating green

corridors to cool and connect city neighborhoods. These approaches address climate impacts by working with natural processes. For example, vegetation can lower temperatures by providing shade and cooling the air, while green and permeable areas allow rainwater to soak into the ground, reducing surface runoff and flood risk.[42]

Across Europe, city climate plans have enthusiastically embraced NBS. **An analysis of local climate adaptation plans found that 91% of European cities include nature-based solutions among their planned measures.**[11] This high uptake reflects a broad recognition of the effectiveness and multi-functionality of green infrastructure. Many European cities are already implementing flagship NBS projects. For instance, Madrid has launched a Metropolitan Forest project, a green belt of trees around the city aimed at lowering temperatures, sequestering carbon, and improving air quality as the climate warms.[11] In Copenhagen and Rotterdam, networks of parks, ponds, and green streets form part of "cloudburst" stormwater management plans, designed to absorb and channel intense rainfall, thereby preventing flash floods in urban districts. Similarly, the city of Gothenburg has created blue-green plazas and rain gardens to "embrace the rain," turning formerly flood-prone areas into attractive landscapes that temporarily hold excess water during storms.[11] These examples illustrate how NBS can transform urban vulnerabilities (like flood zones or overheated streets) into assets that enhance resilience.

Nature-based solutions also offer significant social and ecological co-benefits that strengthen community resilience. Urban greening can improve public health by reducing air pollution and providing cooling during heatwaves, which is especially beneficial for vulnerable groups such as the elderly or those without access to air conditioning. Green spaces and tree canopy have been shown to lower urban temperatures, with studies indicating that well-vegetated areas can be several degrees cooler than surrounding city streets during a heatwave.[11] Moreover, green infrastructure contributes to residents' quality of life and mental well-being, and can foster social cohesion by creating pleasant communal spaces. There is also an equity dimension: ensuring that all neighborhoods, including low-income and marginalized communities, have access to parks and green features is increasingly seen as part of climate justice in adaptation planning. Neighbourhoods with less green space often overlap with those of lower socio-economic status, exacerbating vulnerabilities.[11]

Circular Economy Approaches in Adaptation

Circular economy principles, reducing waste, reusing resources, and recycling materials, are traditionally discussed in the context of sustainability and mitigation, but they also intersect with climate adaptation strategies in cities. A circular economy approach can bolster urban resilience by decreasing dependency on external resources and infrastructure, and by ensuring that essential services continue during climate stresses. European cities have begun to explore how circular practices in water management, energy, and materials can contribute to adaptation. One key area is water reuse and efficiency, which has become increasingly important as climate change intensifies droughts and water scarcity in parts of Europe. For example, France recently acknowledged that it has fallen behind in wastewater reuse and is now taking steps to "catch up" – implementing policies and pilot projects to treat and reuse municipal wastewater for purposes

like irrigation, industrial processes, and urban greenery maintenance.[43] By recycling water that would otherwise be discharged, cities can secure alternative water sources to cope with drought conditions, thus enhancing water security in a changing climate.

Public acceptance of circular water measures, once thought to be a major hurdle, is improving. New surveys across Europe revealed that citizens are more open to recycled water than previously assumed.[44] This shift in social attitudes, driven in part by greater awareness of water scarcity and successful communication campaigns, is enabling urban utilities to implement innovations like using treated wastewater for park irrigation, street cleaning, or replenishing aquifers. In addition to water, circular economy approaches are being applied to materials and waste systems in ways that support adaptation. For instance, better waste management (reducing garbage accumulation) can prevent blocked drainage systems and thus mitigate urban flooding during heavy rains.[45]

Another aspect of circular adaptation is the emphasis on local self-sufficiency and resource loops. Urban farms and local food production can reduce reliance on long supply chains that may be disrupted by climate impacts elsewhere. By producing food closer to consumers, cities not only cut emissions but also improve resilience to climate-induced crop failures abroad.[46] The same logic applies to energy: distributed renewable energy systems (like solar panels on buildings, coupled with battery storage) create local energy loops that are less vulnerable to widespread grid outages from storms or heatwaves. Cities in Finland have projects that capture waste heat from data centers to heat the city, a circular approach to energy that also provides reliable heating during cold spells without solely depending on distant gas supplies.[47]

At the policy level, the EU's Circular Economy Action Plan and related initiatives (e.g. the Circular Cities and Regions Initiative) encourage cities to adopt circular practices, and this indirectly supports adaptation. These strategies often include measures like promoting the reuse of rainwater, encouraging local urban agriculture, and designing buildings for modularity and reuse (so they can be more easily repaired or adapted to new uses as needs change). By embedding flexibility and resourcefulness into the fabric of the city, circular economy approaches make urban systems more robust against shocks and stresses, including those exacerbated by climate change. By reducing waste and inefficiency, and by creating closed-loop systems for water, energy, and materials, cities enhance their ability to withstand and bounce back from climate-related disruptions.[11]

Urban Planning and Policy Integration for Adaptation

Mainstreaming climate adaptation into urban planning is critical to ensure that cities systematically address climate risks through land-use decisions, infrastructure investments, and development policies. National and EU-level policies have increasingly supported the integration of adaptation into urban planning. Several European countries now require or strongly encourage municipalities to include climate risk considerations in local land-use plans or urban master plans. The European Commission likewise advocates for climate-proofing all new urban projects; guidelines on climate-resilient infrastructure and building design[40] have been published to assist

urban planners and architects in considering future climate conditions (e.g., increased rainfall, higher temperatures) in their designs. As a result, we see more examples of climate adaptation being embedded directly into urban development decisions.

Early Warning Systems and Climate Resilience

Early warning systems (EWS) are a vital component of urban climate adaptation, as they enable cities and citizens to prepare for and respond to imminent climate hazards, from heatwaves and storms to floods and wildfires.[48] Europe's cities benefit from relatively advanced meteorological services and disaster management agencies, yet recent extreme events (like the devastating flash floods in Germany, the Netherlands and Belgium in 2021) have exposed gaps in warning dissemination and emergency preparedness.[49] Strengthening early warning systems has therefore become a priority in building urban resilience. An effective EWS is often described as people-centered, comprising four key elements: (1) risk knowledge (identifying and assessing hazards and vulnerabilities), (2) monitoring and forecasting of hazards, (3) communication and dissemination of alerts, and (4) response capability (ensuring communities and services can act on the warnings).[50] Many European cities are working to improve each of these components.

Research shows that well-prepared early warning and response systems dramatically reduce mortality and damages from disasters. According to the United Nations, having a 24-hour advance warning of a coming storm or heatwave can cut the ensuing damage by an estimated 30% by enabling preventative actions.[51] The European Environment Agency also reports that where early warning systems are in place, the number of fatalities from extreme weather events has generally declined over the past decades, even as the frequency of events has increased.[13]

In conclusion, early warning systems form an indispensable part of urban climate adaptation strategies. They represent the last line of defense, ensuring that even when prevention (through infrastructure or planning) is exceeded by an extreme event, communities still have a chance to protect themselves through timely action. Europe's challenge moving forward is to continue improving the precision of forecasts, the reach of communications, and the readiness of its urban populations to act on warnings. This includes addressing the "last mile" of early warnings: making sure alerts are understandable and accessible to all, including non-native language speakers, people with disabilities, and those without easy access to digital media. By investing in both high-tech solutions and community-centered approaches, European cities are striving to minimize the human and economic toll of climate-related disasters through robust early warning and rapid response systems.

Digital Innovation in Urban Climate Adaptation

Digital innovation is playing an increasingly prominent role in European cities' climate adaptation efforts. From big data analytics to geospatial mapping and simulation tools, technology is enabling cities to better understand climate risks, plan interventions, and engage the public in resilience-building. One cutting-edge example is the emergence of "digital twin" models for cities,

virtual replicas of urban environments that can simulate the impacts of climate change and test adaptation scenarios. Several European cities have started developing digital twins of their infrastructure and landscapes.[52] These interactive 3D models allow planners to visualize, for instance, how different flood defense options would perform in a severe storm or how planting trees in various locations might reduce temperatures at street level. Although the use of digital twins in urban adaptation is still in its early stages, experts anticipate it will become a pivotal tool for urban planning under climate uncertainty, enabling evidence-based decisions and real-time monitoring of city systems.[52]

Data is at the heart of digital climate innovation. Across Europe, cities are harnessing climate data platforms and sensors to inform adaptation. The Copernicus Climate Change Service and the European Climate Data Explorer provide city-specific datasets and projections (such as expected changes in heat days or precipitation extremes), which municipalities can integrate into their risk assessments. Many cities are also deploying Internet of Things (IoT) sensors throughout the urban environment. For example, networks of temperature and humidity sensors to map urban heat islands in high resolution, or smart rain gauges and soil moisture sensors to detect flood risks in real time.[11] These data streams, combined with AI and machine learning algorithms, can improve early warning capabilities (as discussed in the previous section) and optimize the operation of adaptive infrastructure. For instance, in Rotterdam, a system called *RainGain* uses radar rainfall data and IoT sensors to predict which parts of the city's drainage network will overflow, enabling dynamic control of pump stations and storage basins to prevent flooding.[53]

Public-facing digital tools are also enhancing community engagement in adaptation. Interactive hazard maps and risk assessment apps have become common in Europe's cities, allowing residents to see if their property lies in a floodplain or how heat risk varies across neighborhoods.[12] These tools empower citizens with information and can spur individual and collective action (such as property-level flood proofing or community tree planting initiatives).

An exciting area of digital innovation intersects directly with youth engagement. Recognizing that young people are digital natives, some adaptation projects have leveraged gamification and virtual reality to involve youth in resilience planning.[54] A notable case is in Oslo, Norway, where researchers used augmented reality (AR) as a tool to include youth in urban planning processes for climate adaptation. This interactive experience not only educated youth about local climate risks but also solicited their input on preferred solutions, effectively making urban planning a collaborative, immersive exercise.[55] Such digital engagement approaches can spark creativity and a sense of ownership among young participants, bridging the gap between technical planning and community values.

Grassroots Initiatives and Citizen Engagement

Grassroots initiatives and community engagement are fundamental to building urban climate resilience from the bottom up. While governments and experts design large-scale adaptation strategies, it is often local communities and civic groups that drive practical action on the ground

and ensure adaptation measures are equitable and culturally appropriate; and therefore ensuring that climate resilience can happen in practice

One prominent grassroots movement is the Transition Towns network, which began in the United Kingdom and has spread to other European countries.[56] Transition initiatives are community-led projects aimed at increasing self-sufficiency and resilience in the face of climate change and economic instability. They often include efforts like setting up local renewable energy schemes, sharing tools and knowledge for water conservation, or developing community emergency plans. These grassroots projects typically operate outside formal government programs, yet they can have significant impacts and sometimes inspire municipal policies. For example, some Transition Town groups have collaborated with city councils on establishing urban orchards or improving cycling infrastructure as climate-friendly transport, showing how bottom-up ideas can influence top-down planning.[11]

Citizen engagement in formal adaptation planning is increasing as well. Recognizing that community buy-in and knowledge are critical for successful adaptation, many cities have created participatory channels within their adaptation planning processes. One effective approach is participatory budgeting focused on climate resilience. Pioneered in cities like Lisbon, "green" participatory budgeting allows residents to propose and vote on climate-related projects for their neighborhoods, funded by a portion of the city budget.[57] This has led to the implementation of numerous micro-projects, such as rainwater harvesting systems for community centers, street tree planting drives, or small-scale solar installations, that might not have been prioritized in top-down plans but which address community-identified needs. Participatory budgeting has contributed to both adaptation and mitigation in cities by empowering citizens to shape local climate solutions and by fostering trust between communities and authorities. In European cases, winning proposals from climate-themed participatory budgeting rounds have been incorporated into official city plans and budgets, demonstrating that citizen-driven ideas can directly translate into concrete adaptation actions.[58]

Youth Engagement in Urban Climate Adaptation

Youth engagement has become an increasingly important element of climate adaptation in Europe. Young people have played a prominent role in climate advocacy, most visibly through movements such as Fridays for Future, which since 2018 have mobilized millions of students to demand climate action.[11] Although early youth activism focused primarily on climate mitigation, there is growing recognition of the need for youth involvement in adaptation. Young people bring creativity, urgency, and a long-term perspective, contributing through education, awareness-raising, planning, decision-making, and practical implementation.

Organized youth networks and capacity-building initiatives have strengthened young people's engagement with adaptation. The Global Youth Climate Network, in collaboration with Generation Climate Europe, has developed training programmes that enhance young Europeans' understanding of local climate impacts and equip them to implement community resilience projects. Youth participation has also been supported through Youth Adaptation Forums on locally

led adaptation, culminating in a global forum in Bonn in 2023.[59] There, young delegates, including European representatives, presented proposals to improve youth inclusion in national and local adaptation planning, emphasizing intergenerational equity and calling for **formalized roles for youth in decision-making processes, sustained financial support, and accountability mechanisms to move beyond one-off consultations**.

Youth-led projects further demonstrate the practical value of youth engagement. In the Netherlands, university students have worked with local authorities to design water-based solutions such as floating pavilions in Rotterdam's canals.[60] Youth are also active in climate-related innovation, participating in hackathons and startup incubators that develop adaptation-focused technologies, such as heatwave alert applications and low-cost environmental monitoring sensors, often supported by EU programmes or philanthropic funding.

Despite these contributions, youth engagement faces significant challenges. Limited access to funding, weak institutional channels for participation, and tokenistic involvement remain common barriers. Young people also highlight inequalities in participation, as marginalized youth are often underrepresented. Addressing these barriers requires dedicated resources, **clear mandates for youth participation within governance structures**, and recognition of informal youth action—including digital awareness campaigns—as legitimate contributions to adaptation efforts.[59]

Policy frameworks at both European and international levels show increasing support for more meaningful youth engagement. The EU Youth Strategy and programmes such as Erasmus+ promote environmental engagement, including adaptation, by providing funding and institutional support for youth-led initiatives. Similarly, the UNFCCC's Action for Climate Empowerment (ACE) framework[61] emphasizes education, public participation, and youth empowerment in climate action, explicitly encouraging the **integration of youth into ongoing adaptation planning, implementation, and monitoring rather than ad hoc consultation**.

Overall, youth engagement strengthens urban climate adaptation by combining innovation, participation, and intergenerational justice. Young Europeans are not only advocating for climate resilience but are actively shaping and implementing adaptation measures. Cities that invest in youth education, participation, and support for youth-led solutions are likely to develop more inclusive and resilient responses to climate change.

Challenges and Limitations Affecting Youth Engagement in Urban Climate Action

While youth engagement offers significant opportunities for strengthening urban climate resilience, it is also shaped by structural and socio-economic constraints that can limit participation and impact. Recognising these challenges is essential for designing realistic, inclusive, and effective engagement strategies, particularly in economically vulnerable urban contexts.

One major challenge is climate fatigue and disengagement, especially among young people who experience prolonged exposure to climate-related messaging without seeing tangible policy change. This can lead to frustration, apathy, or withdrawal from formal participation processes. Economic precarity further constrains engagement, as many young people face insecure employment, rising living costs, and limited access to time and resources, making sustained voluntary participation in climate initiatives difficult.

Access barriers also play a role. Youth from lower-income backgrounds, migrant communities, or marginalised neighbourhoods are often underrepresented in formal consultation spaces due to language barriers, lack of information, or limited trust in institutions. In some cases, participation mechanisms rely on unpaid labour or technical knowledge, inadvertently excluding those with fewer opportunities. These dynamics risk reinforcing existing inequalities within youth engagement itself.

Additionally, institutional trust and power asymmetries shape youth participation. Young people frequently report experiences of tokenism, where their input is solicited but not meaningfully integrated into decision-making. Without clear feedback loops, transparency about how youth contributions are used, and shared decision-making power, engagement processes may lose credibility.

Making these constraints visible can better prepare partners for implementation realities and support more equitable and durable youth engagement in urban climate resilience.

Key Takeaways: European Urban Climate Adaptation Strategies

- **Leveraging city networks and partnerships** (such as C40, ICLEI, and the Covenant of Mayors) can enhance peer learning, capacity-building, and the scaling up of effective urban resilience practices.

- **Expanding the use of green infrastructure and nature-based solutions** is increasingly recognised as a central adaptation strategy, offering cost-effective protection against heat and flooding while delivering social, health, and ecological co-benefits.

- **Exploring circular economy approaches within adaptation strategies** can improve urban resilience by reducing dependence on external resources, enhancing water and energy security, and increasing system flexibility under climate stress.

- **Integrating water reuse, waste reduction, and local resource loops** may support adaptation to droughts, flooding, and supply disruptions, while also strengthening long-term sustainability.

- **Enhancing early warning systems and response capacity** remains a key component of urban resilience, particularly when systems are people-centred, inclusive, and supported by strong communication and preparedness measures.

- **Harnessing digital innovation and data-driven tools** (such as climate data platforms, sensors, and digital twins) can strengthen cities' ability to assess risks, test adaptation scenarios, and manage climate impacts in real time.

- **Recognising and supporting grassroots and community-led initiatives** can enhance local ownership of adaptation measures and ensure responses are socially grounded and context-specific.

- **Embedding participatory approaches, such as climate-focused participatory budgeting**, may help translate community priorities into concrete adaptation actions while building trust between residents and authorities.

- **Addressing structural barriers to youth participation**, including funding gaps and limited formal representation, can help ensure youth engagement is sustained, inclusive, and impactful.

3.

YOUTH ENGAGEMENT IN UCR

Young Europeans have been leading voices in calling for more ambitious urban climate action, consistently ranking environmental issues among their top concerns. In a recent EU-wide survey of people aged 16–30, one third said that protecting the environment and combating climate change should be the Union's highest priority for the coming years.[62] Climate change is not just an environmental problem in the eyes of this generation, it is also a matter of intergenerational justice and human rights. The Council of Europe has highlighted that climate action is one of the top priorities of young people in Europe, and that they often view the climate crisis through the lens of fairness for future generations and the rights of those most affected.[63] Yet despite their passion and stake in the future, youth are too often excluded from formal climate decision-making. This makes it all the more urgent to understand and elevate young people's perspectives on what a climate-resilient city should look like.

This section aims to explore the priorities that young people emphasize within urban climate resilience, and why these priorities matter. Broadly, European youth tend to champion solutions that are sustainable, inclusive, and improve daily life in their communities. The discussion is organized around key domains that feature prominently in youth climate dialogues: sustainable mobility, sustainable food systems and waste reduction, public spaces and green infrastructure, and equity and climate justice. In each of these areas, young people are pushing for changes that not only reduce emissions or protect against climate hazards, but also enhance social well-being and fairness. By illuminating these youth priorities, we gain insight into how climate resilience initiatives can align with the values and expectations of the next generation.

Youth priorities within UCR

The four youth priorities presented in this section: sustainable mobility and transportation; sustainable food systems and waste; public spaces and green infrastructure; and equity, inclusion, and climate justice, were identified through a synthesis of youth-focused surveys, consultation outcomes, academic studies, and policy-oriented youth statements at European level. These domains consistently emerge across youth climate dialogues as areas where climate adaptation intersects most directly with young people's daily lives, future prospects, and sense of agency in cities.

Rather than representing an exhaustive list of all youth concerns, these priorities reflect thematic areas where youth perspectives are particularly strong, well-documented, and closely linked to urban climate resilience outcomes. As such, the priorities are intended to serve as a practical analytical framework for understanding how youth contribute to, and shape, urban climate resilience efforts.

1. Sustainable Mobility and Transportation

Urban mobility is a critical issue where young Europeans seek both climate sustainability and personal empowerment. Surveys indicate that young people are willing to make significant lifestyle changes in transport to combat the climate crisis. Over half of 18–24 year-olds in a seven-country European poll said they would give up car usage, relying only on walking, cycling or public transit, to reduce emissions (far more than older generations).[64] This readiness reflects both climate concern and a desire for accessible, independent mobility. In a recent URBACT consultation, youth participants underscored the importance of public transport and bicycle lanes, noting that these enable them to be "more mobile, independent, and empowered" in city life.[65] The value placed on autonomy and freedom of movement is a recurring theme: comparative research across global cities finds that young urban residents associate local transport with affordances of autonomy, social inclusion, and health.[66] Reliable public transit and safe cycling infrastructure are not just transportation modes for youth, but symbols of climate-friendly innovation that improve daily life and reduce car dependency. Furthermore, youth-led urban initiatives often champion active mobility; for example, the city of Zaragoza's program to promote

cycling among students is celebrated as fostering sustainability *and* youth independence.[65] Taken together, evidence shows European youth prioritize sustainable mobility options that align climate action with better accessibility, safety, and agency in their cities.

2. Sustainable Food Systems and Waste

Many young Europeans are also rethinking urban food systems through a climate resilience lens. They tend to favor sustainable consumption patterns and are open to changing personal habits around food to reduce environmental impact. For instance, younger generations are more willing to reduce meat and dairy consumption compared to their elders. 21% of Europeans aged 18–24 have cut (or would cut) out animal products entirely for environmental reasons, a higher share than in older cohorts.[64] This reflects growing awareness among youth of the carbon footprint of diets and the link between food choices and climate change. Youth-led movements have popularized waste-free living, urban gardening, and plant-based diets as practical climate solutions. The motivations behind these priorities are multifold: ethical (concern for animals and global justice), environmental (reducing emissions and waste), and health-related. In European cities, young people often spearhead community gardens, food-sharing networks, and anti-food-waste campaigns as means to improve local resilience of food systems.[67] They see resilient food systems as those that are local, low-carbon, and accessible to all. **Overall, the literature indicates that Europe's youth view their food choices and food policies as integral to climate resilience, an area where personal responsibility and systemic change must go hand in hand.**[68]

3. Public Spaces and Green Infrastructure

Safe, inclusive public spaces and access to urban green infrastructure are high priorities for young people, who link them to both community resilience and personal well-being. In tandem, urban green spaces and nature-based infrastructure are seen by young Europeans as vital to a climate-resilient city.[69] Green parks, street trees, and gardens serve multiple purposes that youth value: they offer areas for recreation and relaxation, improve mental health, mitigate pollution, and help cities adapt to heatwaves or floods. In research spanning several countries, access to green space emerged as a key factor for youth well-being, associated with affordances for relaxation, reflection, and physical fitness.[66] Young respondents frequently mention the need for more greenery and "regreening" of urban areas.[70] Notably, when asked about solutions to urban challenges, youth often support nature-based solutions, for example, tree planting or community gardens, that enhance climate resilience while beautifying neighborhoods.[70] This suggests that European youth appreciate green infrastructure not only for its environmental benefits (like cooling and flood control) but also as a means to improve daily urban life and social cohesion. In sum, the literature portrays young people's ideal city as one with plentiful shared public spaces and green refuges that are safe, accessible, and co-managed by the community, features they deem essential for urban resilience in the face of climate stress.[71]

4. Equity, Inclusion and Climate Justice

Across all these domains, the overarching thread in youth priorities is a strong insistence on equity and climate justice in urban climate action. Young Europeans tend to frame climate resilience not merely as a technical challenge but as a social one: they are keenly aware that climate risks and environmental burdens are unevenly distributed by geography, generation, and socio-economic status.[63] Thus, they advocate for solutions that prioritize vulnerable communities and future generations, embodying the principle of intergenerational justice. The European Youth Forum and other youth-led bodies have explicitly demanded climate policies that *"fully support those most affected"* by climate change and environmental degradation.[72] In urban contexts, this translates to calls for *climate justice at the city level*: ensuring that resilience planning addresses low-income and marginalized neighborhoods (which often lack green space or suffer higher pollution), and that youth from all backgrounds have a say in shaping their environment. Case studies show youth are troubled by exclusion from decision-making and by inequities in access to amenities. For example, research on youth well-being in cities notes that inequitable access to public spaces and services is a significant concern, and that empowering diverse youth is necessary to transform urban spaces for the better.[71]

Inclusion of youth voices is itself seen as a justice issue by young people. They argue that those who will live longest with climate change outcomes (the youth and coming generations) deserve a seat at the table now. This is why youth activists demand meaningful participation in urban planning, budgeting, and climate policymaking, moving from tokenistic consultation to genuine power-sharing.[73] The C40 Cities network notes that youth have been instrumental in pushing climate onto political agendas by *"demanding justice, urgent transformation, and a seat at the decision-making table"*.[73] Likewise, a recent Committee of Ministers recommendation in Europe emphasizes removing structural obstacles that limit young people's voice in climate decisions, linking this with protecting their rights in the climate crisis.[63] Youth-led projects like CLIMentines (an Erasmus+ initiative) and various European Youth Capital programs focus on empowering underrepresented young people to engage in climate action, emphasizing that empowerment and capacity-building for youth, especially those with fewer opportunities, is a prerequisite to equity.[74] In summary, European youth consider social and climate equity non-negotiable: they want climate-resilient cities that are not only greener but also fairer, and they are motivated by a vision of resilience that protects the most vulnerable, bridges social gaps, and gives them agency in shaping a sustainable future.

This section has demonstrated that youth aged 18–30 across Europe place a strong emphasis on people-centered, justice-oriented approaches to urban climate resilience. They prioritize sustainable mobility, climate-friendly food systems, inclusive public spaces, pollution reduction, and equitable climate action because these directly affect their lives and futures. Young people's concerns are grounded in a desire for livable cities that safeguard both the environment and community well-being, and they are motivated by values of fairness, inclusion, and the urgency of the climate crisis.

Examples of Co-Designed and Youth-Led Adaptation Projects

Nature-Based Solutions Co-Designed by Youth: In Szombathely, Hungary, an EU-funded project transformed a grey schoolyard into a green, climate-resilient space through a co-creation process involving students, teachers, and city staff. Workshops used tools like personas and stakeholder mapping to move from vague ideas to concrete priorities such as food-growing areas, summer shade, and educational gardens.[75] The result was a co-designed vision for a living schoolyard with features like composting sites, student-run planting beds, and tree-lined "biodiversity corridors" for cooling. This bottom-up approach not only produced a design, but also activated an ongoing network of youth and decision-makers to implement and adapt the solution over time. Such youth-inclusive nature-based solutions (NbS) in schools serve multiple goals, climate adaptation, biodiversity, and education, while ensuring the next generation helps shape and care for these spaces.[75]

Youth Urban Gardening and Farming: Across Europe, youth groups are also leading urban farming and greening initiatives that bolster climate resilience. For example, the Erasmus+ "Urban Youth Gardens" project works in several countries to reconnect young people with nature through community gardening. It encourages youths to convert small urban spaces, balconies, schoolyards, rooftops, into gardens to grow food and greenery.[76] By cultivating crops locally, young participants not only improve urban food security but also create green oases that help cool neighborhoods and absorb runoff. Such grassroots urban gardening efforts illustrate how youth-led adaptation can be both practical and educational, building social bonds and environmental stewardship at the community level.

Creative Climate Adaptation by Communities: Many adaptation projects engage youth alongside other residents in hands-on solutions. Under the EU's New European Bauhaus initiative, for instance, locals in Extremadura (Spain), including young people, co-created the "Tejiendo La Calle" project, knitting colorful street canopies from upcycled plastic bags to provide shade during heatwaves. This low-tech solution cools public spaces while raising awareness, blending art and adaptation. Youth are also contributing to digital innovation for resilience: the Global Center on Adaptation notes that tech-savvy youths have developed apps and early-warning tools in some communities as part of hackathons and innovation labs. From high-tech to handmade, young people are co-creating adaptation solutions suited to their local urban contexts.

Young Climate Professionals (YCP) is an EU-funded youth programme created by THE CIVICS Innovation Hub to equip young Europeans (18–25) with the knowledge, skills, and confidence to lead climate action in their communities. The initiative blends green literacy, civic education, and project-based learning, enabling participants to translate European Green Deal objectives into practical, local climate solutions, many with direct relevance to urban climate resilience.[77] These were the latest winning cases:

1. YouFoodHero (Germany)
A youth-led programme offering plant-based cooking workshops for teenagers (12–17). It

combines climate education, nutrition, and life-skills, showing how sustainable diets reduce carbon footprints. The project blends theory (food systems + climate) with hands-on cooking.

2. Empowering Future Leaders Through Climate Education (Kosovo)
A structured climate education curriculum for students in rural areas. Workshops build climate knowledge, leadership capacity, and practical sustainability skills. Designed for replication across underserved communities.

3. Pikë Uji 2.0 – "Water Spot" (Albania)
A public drinking-water fountain installed in Korça or Durrës, paired with an educational banner on climate and water conservation. The project supports resilience (heat adaptation), reduces plastic waste, and activates public space.

4. FLOW and FORM (Austria)
A creative art–science project engaging youth and local residents with river systems in the Salzach region. Through workshops and installations, participants explore hydrology, human impacts, and water-related adaptation challenges.

Partnerships Between Youth and Municipal Governments

Many European cities have formalized partnerships with youth to ensure their voices guide climate adaptation planning and policy:

- **Youth Participatory Budgeting:** Cities in Portugal and Romania have pioneered participatory budgeting processes dedicated to youth proposals on community improvement (including climate resilience projects). In Cluj-Napoca, Romania, the city's *Com'ON* initiative is a participatory budgeting model tailored for young residents. It has supported over 1,000 small youth-driven projects, with more than 50,000 community members (peers and neighbors) voting on which ideas get funded.[65] In Cascais, Portugal, a dedicated Youth Participatory Budget invites people aged 14–30 to propose, develop, and vote on projects, with winning ideas, ranging from cultural events to small infrastructure or green projects, funded and implemented by the municipality.[65] Even mid-sized cities like Valongo, PT have similar youth budgets requiring that all proposals come from youth themselves, reinforcing that young people's ideas can lead to tangible change.[65] This level of involvement goes well beyond consultation: youth directly decide how a portion of city funds is spent, and city councils integrate the results into official plans.
- **Youth Climate Councils and Advisory Bodies:** Spurred by networks like C40 Cities, a growing number of European municipalities are establishing *Youth Climate Councils* that institutionalize youth input into urban climate policy. For example, London (UK) and Milan (IT) have each engaged youth panels to advise city leaders on climate strategies.[73] In 2022, C40 launched a global City Youth Climate Council network to strengthen and connect such bodies, with mayors pledging to involve young people in local climate decision-making as key stakeholders.[73] These councils typically meet regularly with municipal officials,

co-develop policy recommendations, and monitor climate action progress. While many focus on mitigation (energy, transport, etc.), they are increasingly addressing adaptation issues like heatwaves and flooding. The political impact is evident: several C40 member cities have reported that their youth councils' recommendations are being folded into climate action plans and resilience strategies.[73] This formal partnership model elevates youth from protestors outside City Hall to partners inside it.

- **Joint Youth-Municipal Climate Projects:** In some cases, youth organizations and city agencies are collaborating on project implementation. A notable example is Cascais, Portugal's "AdaptCascais" program, where the city runs calls for proposals and a Youth Climate Fund to support youth-led climate resilience projects.[78] Winning ideas (proposed by local youth groups or students) receive small grants and city support to execute the project. So far, funded projects have included training fishermen in proper plastic waste disposal (to protect coastal resilience), a public exhibit on marine litter, and a "one youth, one tree" campaign to boost urban tree cover.[78] The city also offers a youth climate empowerment program with workshops and field activities to build capacity.[78] By providing resources and mentorship, municipalities like Cascais are essentially incubating youth solutions that align with the city's adaptation goals. Similarly, Vilnius, Lithuania launched Climate Neutral Communities in 2024. Over 20 neighborhood groups (often youth-driven) engaged in urban beekeeping, tree planting, and fridges tackling food waste, backed by a municipal grant program (up to €5,000 per project).[65] These examples show how direct partnerships and co-funding between cities and their youth can accelerate local adaptation actions.

Youth Networks and Transnational Engagement in Climate Adaptation

Youth-led networks play an increasingly visible role in shaping climate adaptation discourse and practice in Europe. Generation Climate Europe (GCE), the largest coalition of youth-led climate and environmental organizations at the European level, represents dozens of youth networks and engages directly with EU institutions on climate and sustainability policy.[79] While much of GCE's work has historically focused on mitigation and climate governance, the coalition increasingly engages with adaptation-related issues through policy advocacy, capacity building, and structured dialogue with decision-makers, including participation in Youth Climate and Sustainability Round Tables hosted by EU bodies.[80]

At the international level, youth engagement in adaptation has been supported through initiatives led by the Global Center on Adaptation (GCA). GCA has convened a series of Regional Youth Adaptation Forums designed to strengthen youth participation in adaptation policy and practice, promote locally led adaptation, and foster transnational learning among young climate leaders.[81] In 2023, one such regional forum was held in Bonn, Germany, bringing together young participants from Europe and other regions to exchange knowledge, discuss adaptation challenges, and develop policy-oriented recommendations aimed at improving youth inclusion in national and local adaptation planning.[59]

These forums emphasize the role of youth not only as advocates, but as contributors to adaptation solutions and governance processes. Outputs from the Youth Adaptation Forums have included collective statements, policy recommendations, and commitments to strengthen youth-led and youth-informed adaptation initiatives, particularly in urban and vulnerable contexts.[81] Supported by international organizations and linked to broader UN climate processes, these initiatives reinforce the idea that youth participation in adaptation extends beyond symbolic consultation toward more structured engagement in decision-making and knowledge exchange.

In parallel, youth engagement in climate adaptation is also emerging in regionally vulnerable contexts, including Europe's Arctic and sub-Arctic areas. Research and policy-oriented initiatives increasingly recognize the importance of Indigenous and youth perspectives in addressing adaptation challenges such as permafrost thaw, infrastructure vulnerability, and urban resilience in northern regions.[82] While youth-led Arctic organizations vary in scope and influence, the growing inclusion of youth perspectives in Arctic climate research and planning highlights that young people in climate-exposed regions are active participants in adaptation debates rather than passive recipients of climate impacts.

Overall, these examples illustrate how youth engagement in climate adaptation operates across multiple scales, from EU-level advocacy to transnational forums and region-specific adaptation discussions. European frameworks such as the EU Youth Strategy and the European Climate Pact further encourage youth participation in climate action, including adaptation, by providing institutional recognition and opportunities for engagement.[82] Although challenges remain, particularly in ensuring diversity, sustained participation, and access to resources, youth involvement in adaptation is increasingly embedded in policy processes. This shift suggests a gradual move away from symbolic inclusion toward more substantive youth contributions to urban and regional climate resilience.

Key Takeaways: Youth Engagement in Urban Climate Resilience

- **Recognising youth as essential actors in urban climate resilience** can strengthen adaptation efforts by integrating long-term perspectives, innovation, and intergenerational justice into city responses.

- **Aligning urban resilience initiatives with youth priorities**, such as sustainable mobility, food systems, green public spaces, pollution reduction, and equity, can improve relevance, legitimacy, and uptake of adaptation measures.

- **Supporting sustainable mobility options valued by young people**, including public transport, cycling, and walkable neighbourhoods, can simultaneously advance climate resilience, accessibility, and social inclusion.

- **Integrating youth perspectives on sustainable food systems and waste reduction** can contribute to more resilient urban food chains while connecting personal behaviour change with systemic adaptation.

- **Co-designing green infrastructure and public spaces with youth** can enhance heat and flood adaptation while delivering co-benefits for mental health, community cohesion, and everyday urban quality of life.

- **Embedding climate justice and equity in youth engagement strategies** can help ensure that adaptation measures address uneven exposure to climate risks and include young people from diverse socio-economic backgrounds.

- **Moving toward meaningful, sustained youth participation**, beyond one-off consultations, can support shared ownership of resilience planning and strengthen democratic legitimacy in climate governance.

- **Encouraging youth-led and co-created adaptation projects** can translate climate concern into concrete local action while building skills, confidence, and long-term stewardship.

- **Strengthening partnerships between municipalities and youth organisations** (e.g. participatory budgeting, youth climate councils, co-funded pilot projects) can improve implementation and scale of youth-driven solutions.

- **Supporting transnational youth networks and learning platforms** can amplify youth voices, enable knowledge exchange, and connect local urban adaptation efforts to European and global climate processes.

LIMITATIONS

This report is intended as a desk-based knowledge compilation that brings together existing research, policy frameworks, and documented practice related to youth engagement in urban climate resilience in Europe. As such, its findings and conclusions should be interpreted in light of several important limitations.

First, the report relies exclusively on secondary sources, including academic literature, European Union policy documents, reports from international organisations, city networks, and civil society publications. No primary research, such as interviews, surveys, workshops, or participatory observation with young people or practitioners, was conducted as part of this work. While this approach allows for a broad overview of current debates, policies, and practices across Europe, it also means that the analysis is shaped by the availability, framing, and quality of existing documentation. Lived experiences, local dynamics, and informal forms of youth engagement that are not captured in published sources may therefore be underrepresented.

Second, the examples of youth-led and youth-inclusive initiatives presented throughout the report are illustrative rather than comprehensive or statistically representative. The case studies and practices highlighted were selected to reflect recurring themes, emerging approaches, and promising directions identified in the literature, rather than to provide an exhaustive mapping of youth engagement in all European cities. As a result, the report does not aim to compare cities or initiatives systematically, nor does it claim that the examples presented are typical of all urban contexts. Many relevant initiatives and experiences are likely to exist beyond those included here.

Relatedly, there are limitations linked to geographic coverage and data availability. The report draws on sources that are more readily accessible, often available in English or published through European-level platforms and networks. This may result in a stronger focus on certain regions, cities, or types of actors, particularly where documentation, funding, and institutional support are more established. Youth initiatives in smaller cities, rural–urban contexts, or regions with fewer resources, as well as those documented primarily in local languages, may be less visible. These imbalances reflect broader structural patterns in research and reporting rather than an assessment of where meaningful youth engagement is taking place.

The report also faces challenges in fully capturing the diversity of youth perspectives. Youth are not a homogeneous group, and experiences of climate risk, participation, and empowerment vary widely depending on socio-economic background, gender, migration status, disability, and local context. Desk-based sources tend to highlight organised youth groups, formal participation mechanisms, and well-documented projects, which can inadvertently underrepresent marginalised or less visible youth. Barriers such as language, unpaid participation, limited

institutional trust, and economic precarity can restrict whose voices are heard and recorded, and these dynamics are not always fully reflected in available literature.

Finally, there are limits to assessing the effectiveness and long-term impact of the initiatives discussed. Many youth-led and youth-inclusive projects are recent, small-scale, or experimental, and robust evaluation data are often not yet available. The report focuses on documented intentions, approaches, and early outcomes rather than measured impacts on urban climate resilience over time. As a result, it cannot determine which models are most effective or scalable, nor can it assess long-term sustainability. Further research, including longitudinal studies and participatory evaluation with young people, would be required to deepen understanding of impact.

Taken together, these limitations do not undermine the relevance of the report, but they do frame its purpose. The report is designed to inform, inspire, and support dialogue among Erasmus project partners and wider networks by synthesising existing knowledge and practice. It should be read as a foundation for learning and collaboration, and as a starting point for deeper engagement, rather than as an exhaustive or evaluative assessment of youth involvement in urban climate resilience across Europe.

CONCLUSION

European cities are on the front line of the climate crisis, and the findings of this report make clear that building climate-resilient cities requires both ambitious systemic change and inclusive, bottom-up action. With nearly three-quarters of Europe's population living in urban areas, cities concentrate people, infrastructure, and economic activity, amplifying exposure to climate hazards. Across Europe, intensifying heatwaves, flooding, drought, and water scarcity are already disrupting all major urban systems (water and sanitation, buildings, transport, energy, healthcare, and the urban economy) often in compound and cascading ways. These interconnected risks underscore a central conclusion of the report: adaptation cannot be pursued sector by sector or hazard by hazard, but must be integrated, forward-looking, and grounded in an understanding of how urban systems and vulnerabilities intersect.

A second overarching lesson is that climate resilience and climate justice are inseparable. Climate impacts do not affect urban residents equally, and adaptation strategies that fail to address social vulnerability risk reinforcing existing inequalities. Protecting elderly populations during heatwaves, ensuring climate-resilient housing and services for low-income households, designing child-centred and disability-inclusive adaptation measures, and making early-warning systems accessible to migrants and marginalised communities are not secondary considerations but core requirements for effective resilience. Throughout the adaptation cycle, from risk assessment and planning to implementation and monitoring, a "just resilience" approach is essential to ensure that resources are prioritised where needs are greatest and that the benefits of resilience are shared widely.

The report also highlights that cities are not starting from scratch. European urban adaptation strategies are increasingly drawing on green infrastructure and nature-based solutions, circular economy approaches, improved early-warning systems, and digital tools to manage climate risks more effectively. City networks and partnerships are enabling peer learning and scaling of good practice, while community-led and grassroots initiatives are strengthening local ownership of adaptation efforts. However, technical solutions alone are insufficient. Inclusive governance, sustained funding, and participatory approaches are critical to translating strategies into durable, socially embedded outcomes.

Within this broader picture, youth emerge not as future beneficiaries of urban climate resilience, but as current co-creators of it. As shown throughout the report, young people are already shaping adaptation through advocacy, innovation, community action, and collaboration with municipalities. Youth perspectives bring long-term thinking, creativity, and a strong emphasis on equity, influencing areas such as sustainable mobility, green public spaces, food systems, and digital adaptation tools. Evidence from youth-led and co-created initiatives demonstrates that

meaningful youth participation, supported by formal roles, sustained funding, and genuine decision-making power, can enhance the quality, legitimacy, and social reach of urban adaptation measures. Treating youth engagement as symbolic or episodic risks missing a vital source of capacity for resilience at a time when cities urgently need it.

In summary, building climate-resilient cities in Europe is an urgent and complex challenge, but it is also an opportunity to reimagine urban life on fairer and more sustainable terms. The key takeaways of this report are clear: urban adaptation must be integrated across sectors and hazards; equity and justice must be embedded at the core of resilience planning; and engaging citizens, especially empowering youth as present-day partners in governance and implementation, significantly strengthens climate responses. By combining science-based policies with inclusive, participatory approaches and intergenerational collaboration, European cities can move beyond reactive responses and build resilience that protects people, sustains communities, and endures over the long term.

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