

# CONTEMPORARY URBAN ENVIRONMENTS: GLOBAL URBANISATION PATTERNS

## KEY TERMS

**Urbanisation:** Increase in the proportion of the population living in urban areas.

**Megacity:** A city with a population of over 10 million inhabitants.

**Megalopolis:** A large and heavily populated urban region which consists of several interconnected cities. This occurs where urban areas have grown to a degree that they merge into a continuous sprawling urban expanse.

**World city:** Cities that have a major influence on other cities and countries around the world due to their international connectedness – some are megacities (e.g. New York, Tokyo) but many are not (e.g. London, Moscow, Paris, Berlin). They are major hubs for finance, trade, business, politics and culture.



## REASONS FOR URBAN POPULATION GROWTH

### Rural-urban migration:

- Urban 'pull factors' – anticipation of improved quality of life in a city, e.g. better employment opportunities and better access to education/healthcare/sanitation, etc
- Rural 'push factors' – harsh conditions that make people want to leave, e.g. droughts, food shortages, lack of access to clean water, conflict, etc

**Natural increase:** Where birth rates are higher than death rates (as urban areas tend to have a more youthful population) – natural increase can account for around 40% of the population growth.



## URBAN AREAS

In 2024 56.5% of the world population lived in urban areas – more than 4.3 billion people, and is expected to increase to 68% by 2050.

**Urban area:** 'A dense concentration of inhabitants living in a built-up area with supporting infrastructure and a high density of buildings' – however, different countries use different criteria to classify areas as urban.



## GLOBAL URBANISATION RATES

Urbanisation in lower and middle-income countries is much more rapid than that seen in high developed economies (HDEs) – although it started much later.

Urbanisation in Africa is particularly rapid today.

Urbanisation rates in North Africa, Western Asia, Latin America and the Caribbean are showing signs of slowing down.



## MEGACITIES

Megacities are defined by population size rather than global significance. They have doubled over the past two decades, from 14 in 1995 to 34 in 2024.

Their development is more likely where rapid economic growth is concentrated in a limited number of locations within a country and lead to mass rural-urban migration.

**Benefits:** Efficient infrastructure, e.g. mass transport systems, global hubs for manufacturing and export (e.g. Shenzhen, China), and key markets for basic raw materials, components and energy resources.

**Drawbacks:** Urban problems may be magnified, e.g. congestion, waste disposal, air and water pollution, and lack of housing.



## WORLD CITIES

### Characteristics:

- Concentration of major banks and commercial HQs, stock markets and politico-economic influence, e.g. New York, London and Tokyo – decisions taken there have global significance
- Full range of key influences such as business, media, innovation, culture or politics
- Could be distinctive for their dominance in certain area rather than others, e.g. Paris – culture, fashion, art
- Service information sectors dominate the job market



## % OF POPULATION LIVING IN URBAN AREAS (2024)

Northern America	83.6
Latin America and Caribbean	81.2
Europe	74.9
Asia	51.1
Africa	43.5

# CONTEMPORARY URBAN ENVIRONMENTS: KEY URBAN PROCESSES

## SUBURBANISATION

The movement of people, businesses and retail out from the central city into new estates around the edge of the city called the suburbs.

### Reasons:

- Larger and more modern houses, with larger gardens
- Perception of 'better' schools
- Perception of fewer visible urban problems of crime, gangs, drugs, etc
- Perceived as a rise in status – moving to an 'up market' area



### Consequences:

- Urban 'sprawl' – cities expand rapidly, growing onto greenfield land, causing the loss of agricultural land
- Congestion on roads into the city as people travel in for work/shop/leisure
- Emergence of pockets of affluence and poverty
- Bland landscape of residential estates with very little character

## COUNTER-URBANISATION

People, retailers and businesses leaving the city altogether and relocating in nearby smaller towns and 'dormitory villages' suburbanised villages. It is the reverse flow to 'urbanisation'.

### Reasons:

- Desire for a semi-rural lifestyle in a village setting but wanting to be close enough to the city for jobs/shops/entertainment
- Seen as a 'more wholesome' setting to bring up a family with more open space
- Easy commuter links into work
- Increased ability for remote working due to technological development



### Consequences:

- Growth of villages and small/medium size towns onto greenfield land, and the loss of agricultural land
- Pressure on greenbelt land to permit development
- Change of villages from 'traditional farming village' to 'suburbanised village' – loss of community spirit as more 'incomers' arrive
- Increase in housing prices – could prevent younger locals from buying

## DEINDUSTRIALISATION

A decline in the proportion employed in manufacturing industries.

**Industrial Revolution:** 19<sup>th</sup> century emergence of factories in urban areas – stimulated urbanisation.

**1970/80s:** Decline in the proportion employed in manufacturing industries.

### Causes:

- Competition from cheaper locations overseas
- Relocation to lower-cost labour markets
- Exhaustion of raw materials
- Declining markets, e.g. camera film processing
- Factory jobs replaced by automation



## DECENTRALISATION

Transferring administrative, governance, planning and other functions from dominating urban areas to more local smaller urban areas (sometimes to reduce inequalities within a country)...

- Establishing modern manufacturing and light industrial estates on urban-rural fringe (sometimes leads to the growth of **edge cities**)
- Developing **science and technology parks**, or **business parks**
- Focusing on finance centres, e.g. London Docklands



## URBAN RESURGENCE

The revitalisation of areas within a city (often the inner city) following a period of decline or stagnation. Investment often stimulates renewed growth by diversifying employment opportunities and providing improved facilities and infrastructure.

### Example: Manchester...

- **Media, culture and arts** – MediaCity UK (home of BBC), Manchester Arena
- **Retail** – The Trafford Centre, Arndale Centre, 'Bohemian' Northern Quarter
- **Sport** – Old Trafford, Etihad Stadium and Emirates Old Trafford
- **Transport** – Manchester airport, Metrolink tram network

# CONTEMPORARY URBAN ENVIRONMENTS: URBAN POLICY AND REGENERATION

## URBAN POLICY AND REGENERATION IN BRITAIN - 1979s ONWARDS

**1970s/80s/90s:** Period of major industrial decline – market-led approach to urban issues introduced by Conservative government.

### Key challenges:

- Poor housing conditions – in inner-city housing, but also council estates
- High unemployment following deindustrialisation
- Poor environment in many cities – after years of neglect
- Needed private investment – government couldn't fund everything fully



## URBAN DEVELOPMENT CORPORATIONS (UDCs) - 1980s

Set up to attract investment for redevelopment – managed the improvement of derelict former industrial sites to make them more attractive for developments, e.g. Sheffield UDC landscaped derelict British Steel land – which encouraged the development of Meadowhall Shopping Centre, providing thousands of jobs.

### Example: London Docklands Development Corporation (LDDC)...

Redevelopment of former docks into Canary Wharf financial – centred hundreds of thousands of jobs and completely transformed the area. BUT, existing local communities had little say in the redevelopment, gentrification made them feel marginalised and like 'outsiders', and many were forced move away as they were priced out.



## ENTERPRISES ZONES (EZS) - 1980s

Aimed at growing or attracting new businesses to establish to improve employment prospects, by offering businesses a range of incentives if they located there...

- Lower business rates (tax) for the first few years
- Reduced planning 'red-tape'
- Attractive infrastructure packages (commercial plots with full infrastructure in place available to rent).

EZs still operate today, and 24 new EZs were named in 2012 to reduce regional inequality, e.g. Humber Green Port Corridor.

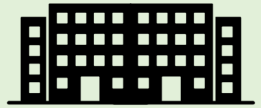


## CITY CHALLENGE - 1990s

'Bottom-up' rather than 'top-down' approach – a competitive bidding process promoted Public-Private Partnerships between city councils and private investors/not-for-profit (NFP) organisations, involving local people and key users.

### Example: Partnership between Manchester City council and construction firm AMEC in Hulme, Manchester (1990s)...

Huge 1970s council estate – famous for being half empty and rife with social issues. The partnership developed a regeneration scheme with mixed-tenure, low-rise buildings, safe green spaces and community facilities – it is seen as one of the most successful large-scale regeneration projects in Europe, and has attracted huge levels of investment since.



## NEW DEAL FOR COMMUNITIES (NDCs) - 2000s

Aimed at improving the most deprived residential areas of 39 cities in terms of crime, education, health, housing, employment and physical environment (holistic view of urban issues).

Emphasis on public engagement and buy-in from local communities – big role in decision-making, acting as one of the main agents of change in the improvements in their neighbourhood.

**Local Strategic Partnerships:** NDCs operate alongside these, which work in the 88 most deprived local authorities in England.



## LOCAL ENTERPRISE PARTNERSHIPS (LEPS) - 2010s

Established to fund housing and infrastructure developments...

- 'City Deal' gave 28 urban areas power to attract private investment
- List of **Enterprise Zones** was the expanded
- **Growing Places Fund** set up to invest in local infrastructure and make sites 'development-ready'

**June 2022:** The government announced a review of the future direction of LEPS focussing on developing local digital economies to stimulate economic growth.





# CONTEMPORARY URBAN ENVIRONMENTS: URBAN FORMS AND SPATIAL PATTERNS

## URBAN FORM

The characteristics that make up built-up areas, including the shape, size, density and configuration of settlements.

### Exogenous factors:

- Flows of people, e.g. in and out migration
- Flows of money/capital, e.g. TNC investment
- Flows of ideas, e.g. architecture, sustain

### Endogenous factors:

- Physical geography, e.g. relief, drainage
- Location and situation, e.g. barriers to expansion
- Demographics, e.g. population size and structure
- Political factors, e.g. strength/success of local authority



## FACTORS THAT INFLUENCE URBAN FORM

**Rapid population growth:** Can lead to urban sprawl and change land use from recreational to residential.

**Transport provision:** Affects how extensive a city can become, e.g. accessibility can lead to commuter settlements developing.

**Land use conflict:** Redevelopment can force house prices up, replacing existing resident with more affluent newcomers

**Tourism:** Growth of service sector means that more land is given over to tourist activities.



## SPATIAL PATTERNS OF INEQUALITY

Wealth varies across urban areas – the general pattern is that as you move to the edge of a city personal wealth increases and houses are bigger and more expensive, BUT, this is also where some of the largest local authority housing estates are found.

**CBD:** Land rents are very high so only the wealthiest can afford to live there (e.g. luxury apartments).

**Inner city:** Houses tend to be smaller and of lower quality – although some have been replaced with modern apartments for young professionals.



## SPATIAL PATTERN

Refers to how the characteristics of an urban area vary across the city, including the pattern of land use, pattern of wealth and how different cultures are often found in particular areas within the city.



### The six main land use types are:

**Residential:** Any form of accommodation, including flats and apartments, terraced, semi-detached, detached housing – varies according to the land prices across the city, e.g. larger residential properties tend to be found towards the outskirts of the city where land prices are cheaper and there is often more available land.

**Transport:** Includes road networks, rail links, bus lanes, cycle land provision and tram tracks. Often leads in towards the CBD in a radial pattern, and in developed established cities there is an integrated transport network which interlinks different modes of transport.

**Commercial:** This relates to offices and retail land use. Most offices and retail properties are located in the CBD so this is the centre of the transport hub and therefore users can access it easily. Out-of-town often lead to the development of 'edge cities'.

**Industrial:** In the 19<sup>th</sup> century factories were often built in the inner-city area (but on the edge at the time), along with rows of terraced houses for their workers. This area was also on many transport routes – rail and canal allowed for easy transportation of raw materials and manufactured goods. Now specialist industries develop on the edge of cities.

**Institutional:** E.g. hospitals, libraries, colleges and schools – dispersed and dependent on demand, i.e. more of them in areas of concentrated housing.

**Recreational:** Includes playing fields, sports fields, golf courses and parkland, and is dispersed as it is related to the demand from people and the provision of green spaces when the city was growing. Large space users, such as golf courses, are often on the periphery of the built-up areas.



# CONTEMPORARY URBAN ENVIRONMENTS: URBAN SOCIO-ECONOMIC ISSUES

## ECONOMIC INEQUALITY IN DEVELOPED WORLD CITIES

**CBD:** Highest land prices so mainly commercial and retail locates here (Bid-rent theory). But recent rise in 'town centre mixed use developments' – often with luxury apartments only suitable for young professionals.

**Inner city:** Usually low-income residents in 19<sup>th</sup> terraced homes built for factory workers – cramped with limited outside space, often poor quality (e.g. damp/mould) leading to ill health of residents. High ethnic diversity.

**BUT,** some redevelopment into modern apartments.

**Suburbs:** Lower density housing with gardens (often semi-detached or detached), more open green spaces and amenities. Mix of cul-de-sacs and quiet residential streets, high reliance on cars. Less ethnic diversity.

**Suburban local authority housing estates:** The suburbs are also home to large local authority housing estates built on greenfield land – these were built to provide a good quality environment, but they are often run-down with many social problems.



## ECONOMIC INEQUALITY IN EMERGING AND LESS DEVELOPED WORLD CITIES

Rapid growth has results in a less formal urban structure. There is still a CBD with commercial and retail businesses, but the pattern of housing is less uniform, with far less wealthy residential areas.

**Gated communities:** Secure developments for the wealthy.

**Informal settlements:** Often 'illegal' and on marginal land (e.g. along railway lines or next to a municipal dump), with limited sanitation, water, basic amenities – waste and contaminated water/land is a problem and disease risk is high. Inconsistent access to education and healthcare.

**Informal economy:** Many businesses set up with few environmental regulations – leads to poor air quality, dumping of toxic waste, as well as unsafe working conditions.



## SOCIAL SEGREGATION AND CULTURAL DIVERSITY IN HIGHLY DEVELOPED CITIES

**Self-segregation:** Where faith, language, culture, and tradition are distinctive from others in the city – new arrivals choose to locate themselves close to centres of religion or amongst people who they share a culture with, e.g. thriving distinct Bangladeshi community in East London. May also be an economic response too – finding work amongst one's own community is often easier.



**Enforced segregation:** When certain areas of a city becoming trapped in a cycle of deprivation, e.g. areas with a high proportion of immigrants may find it harder to access higher education due to language difficulties. Migrants may also find it hard to access social housing and cannot afford mortgages so often live in rented accommodation in the inner city where houses are cramped, and services are limited or overstretched, e.g. schools get worse results and there is a lack of access to well-paid work.



## HELPING THE URBAN POOR IN EMERGING AND LESS-DEVELOPED CITIES

### Site and service schemes:

Locals are allowed to purchase the land and rebuild their houses to a better standard and authorities lay on basic water and sanitation provision.



**Self-help schemes:** People are provided with building materials to reconstruct their housing.



**NGOs:** Often provide education and health care facilities to reduce poverty.

## SOCIAL ENCLAVES

May develop within a city where there is limited assimilation between immigrant communities with each other and/or the rest of the urban population.



Can lead to increases in social tension as a 'them and us' feeling develops – get blamed for other peoples' difficult circumstances, and has spilled into protests and attacks in some cities, and can result in 'no-go' areas.

# CONTEMPORARY URBAN ENVIRONMENTS: URBAN CLIMATE

## URBAN HEAT ISLAND EFFECT

This is where the urban area is significantly warmer than its rural surroundings, due to...

**Albedo effect:** Natural surfaces absorb high levels of radiation and release water vapour through evapotranspiration, which cools the local environment. Urban surfaces are often dark (e.g. tarmac, concrete) and have a lower albedo, as they are composed of materials that readily absorb solar radiation, which is then later re-radiated as heat at night.

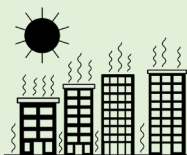
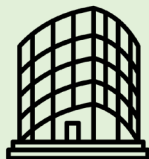
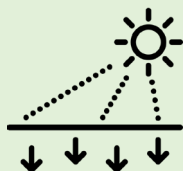
**Modern materials:** E.g. glass or steel can deflect heat towards other buildings or down to street level – can cause heat to be concentrated and trapped in streets below.

**Green spaces:** Vegetation coverage intercepts incoming radiation and stops it being absorbed by the shaded ground – which is why city parks are cooler. A lack of shade across urban areas leads to direct absorption of solar radiation by asphalt, concrete, etc.

**Heat loss:** From central heating, air conditioning and refrigeration systems, as well as from industrial processes and traffic, all add heat to the atmosphere in urban areas.

**Air flow:** Incoming winds from rural areas are intercepted by buildings – so heat is not dispersed.

**Uneven heat distribution:** Higher building densities and areas in a city such as shopping malls and stadiums have a higher temperature due to the use of electricity in these areas giving off heat as a waste product.



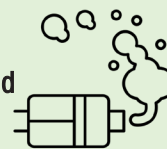
## PRECIPITATION IN URBAN AREAS

Cloud cover is greater over urban areas than rural...

- **Convection currents:** Generated by the higher temperatures in the urban area cause low pressure to form, resulting in more low-level atmospheric convergence and condensation, increasing cloud cover
- **Pollution/dust:** From traffic and industry – generates larger cloud particles that condense quickly, forming dense low cloud

*Both mean that there is more rainfall in urban areas, and more thunderstorms.*

**Winter:** Less likely to snow – likely turn to sleet when it reaches the city due to the urban heat island effect – and any snow that settles on the ground is likely to melt sooner.

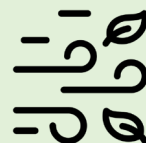


## CITY STRUCTURES AND WIND

Generally, winds are weaker in urban areas as they get intercepted and deflected due to the high buildings. BUT, local urban winds can be strong...

**Tall buildings:** A high density of tall buildings cause frictional drag in the movement of the air, creates turbulence which causes the wind to start to circle, affecting the windward side of a building differently to the leeward side. However, where buildings are widely spaced it has the opposite impact and winds are lighter.

**Venturi force:** Specific urban form can lead to an increase in winds as the straight streets between the buildings act as wind channels - this sudden increase in wind speed can be powerful enough to blow pedestrians over.



## AIR QUALITY IN URBAN AREAS

Air quality in urban areas is poorer than rural areas due to the greater use of fossil fuels in urban areas...

**Particulate matter (PM):** Liquid and solid particles suspended in the air, e.g. soot and ash is given off from transport, factories, and construction.

**Carbon monoxide:** Produced from power stations and waste incineration and during vehicle combustion.

**Sulphur dioxide:** Produced during the combustion of fossil fuels – mixes with water vapour to produce sulphuric acid. This can then fall as acid rain and damage buildings.

**Photochemical smog:** Where pollutants (e.g. hydrocarbons and nitrogen dioxide) in the troposphere react with sunlight – low-level ozone is formed and combines in a chemical 'soup' with particulates and other emissions.





# CONTEMPORARY URBAN ENVIRONMENTS: URBAN DRAINAGE

## URBANISATION AND INCREASED FLOOD RISK

Concrete and tarmac are impermeable – they do not allow water through so water collects as puddles and flows rapidly into drains as surface run-off, which then reaches rivers more quickly, increasing the risk of flooding...

1. Increased precipitation due to urban climate
2. Less vegetation so reduced interception
3. More impermeable surface leads to more surface run-off
4. Sloped roofs and gutters channel water into drains
5. Storm drains transport water into river channel rapidly
6. Lag time reduced and discharge increases rapidly
7. River exceeds its capacity leading to a flood



## MODIFICATION OF URBAN WATER CYCLE

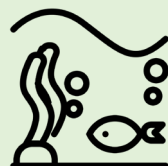
The increased in surface runoff is likely to cause flash floods with damaging consequences:

**Large volume of water:** The larger volume, velocity and duration of flow in the nearby river causes more intensive erosion of the riverbank, damaging river habitats.

**Localised severe flooding:** Urban morphology affects the speed that water reaches the river – streets act like streams, collecting stormwater and channelling it straight into waterways, leading to severe localised flooding. Results in expensive repairs to infrastructure, homes and businesses, affecting the cost of insurance.

**Blocked drains:** Drains often become blocked by urban waste and overflow – causing localised flooding, which is often mixed with sewage or industrial pollutants – at great risk to human health.

**Impact on aquatic ecosystems:** Pollutants will be collected by the water on the impervious surfaces and washed into streams, rivers and lakes. This contamination causes irreversible damage to the aquatic environment.



## PLUVIAL FLOODING

- Caused by excessive rainfall and impermeable surfaces – overwhelms local drains
- Occurs in low-lying urban areas with concrete/tarmac surfaces
- Flash flooding – damages properties and disrupts traffic
- Can be mitigated by Sustainable Urban Drainage Systems (SUDS)



## FLUVIAL FLOODING

- Caused overflowing rivers or streams after heavy rainfall
- Occurs along and close to the riverbank
- Water rises more gradually than pluvial flooding – time to evacuate, but causes more damage
- Can be mitigated by building flood defences



## SUSTAINABLE URBAN DRAINAGE SYSTEMS (SUDS)

Most SUDs aim to store or slowdown the pathway of rainfall to the river channel...

**Storage and release:** During a storm water can be stored in large man-made ponds. It is then released at timely intervals after the storm to limit the flood risk.

**Infiltration basins:** Man-made depressions that hold back surface water and so it can infiltrate slowly into the soil, reducing runoff and recharging groundwater reservoirs. Basins are often landscaped to appear natural and of value to the local community.

**Swales and filter trenches:** Swales are shallow, flat-bottomed drainage areas which capture rainwater and slow down the flow of water so it can infiltrate into the soil. Filter trenches are narrow trenches, filled with gravel which allow storm water runoff to be collected so it can infiltrate slowly into the soil. They are also used to treat pollution as they filter water before it enters the soil, so river water quality is maintained.

**Urban planning:** Buildings are built to intercept run-off water by collecting it on roofs (rainwater harvesting) and reusing it for irrigation or domestic uses within the city. Green roofs are also used to return some of the water back to the atmosphere through evapotranspiration.

**Permeable surfaces:** More rainfall can infiltrate into the soil rather than cause pluvial flooding or contribute to fluvial flooding.



# CONTEMPORARY URBAN ENVIRONMENTS: URBAN WASTE

## THE ISSUE OF WASTE

**Developed world cities:** Here cities produce lots of consumer waste and this is seen as a problem.

Waste is usually taken to landfill close by - but space is limited and there are regulations around waste disposal, which leads to fly-tipping in some urban areas (huge issue in the UK).

**Developing world cities:** Here many people view waste as a potential resource, rather than a problem. On municipal waste tips whole communities of 'rag-pickers' sort through waste brought by refuse lorries to extract whatever is of value from e.g. recyclable metal, plastic, cotton, paper and cans. This is unregulated recycling).

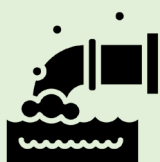


## UNREGULATED WASTE DISPOSAL

**Developed world cities:** Most companies dispose of waste responsibility to avoid fines, but also polluting is viewed as 'bad for business'.

**Developing world cities:** Large companies release liquid and solid waste into waterways and onto land (due to less environmental laws). Water quality is poor and leads to ill-health and affects wildlife habitats.

**Criminal gangs:** Carry out illegal waste disposal for profit - leads to chemicals contaminating water and soil.



## RECYCLING

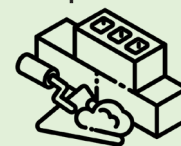
**Developed world cities:** Increase in the amount and range of materials recycled rather than being sent to landfill, e.g. paper, cardboard, plastics, food waste - most local councils collect this from homes or have recycling centres.

**Developing world cities:** Unregulated recycling takes place - many people work informally on city waste tips (ragpickers), and some city authorities pay those who recycle, both in money and food.



## RECOVERY

This takes place in developed world cities - instead of disposing of waste, the original material is reused for another purpose, e.g. the coal ash from coal-fired power stations is used to create breeze-blocks (Concrete Masonry Units - CMUs), reducing the disposal of waste ash into landfill and providing a valuable construction material.



## INCINERATION

Involves the combustion of organic substances contained in waste materials and converts the waste into ash, gas, and heat. The flue gases must be cleaned of gaseous and particulate pollutants before they are dispersed into the atmosphere because they are toxic.

**Energy from Waste (EfW):** Heat generated by incineration can be used to generate electric power - reduces the need for fossil fuel power stations.



## SUBMERGENCE

Waste is placed into water to dispose - but can lead to toxins in water which can affect habitats. Metal containers can be used but these may corrode over time. Where land is at a premium, submerged waste can be used to create new artificial islands, e.g. Tokyo Bay - man-made waste islands are used for freight, warehousing and manufacturing companies rather than housing, but helps ease the pressure on land elsewhere in the city.



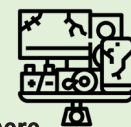
## BURIAL

Most common waste management strategy - most waste is buried in existing landfill sites. Some waste will eventually decompose, but not all, and it may smell or generate methane gas, which is explosive and contributes to the greenhouse effect. Can contaminate land with leached chemicals and toxins.



## TRADE

Waste (including e-waste) is sent to the developing world where it will be sorted and disposed of by poor residents. Some will go into landfill and some will be burned - damaging local air quality and human health.





# CONTEMPORARY URBAN ENVIRONMENTS: OTHER ENVIRONMENTAL ISSUES

## AIR POLLUTION FROM TRANSPORT

**Road network:** The structure of the road network (built before cars) often leads to congestion in certain areas – resulting in a large volume of emissions from ‘idling’ engines.

**Exhaust pollutants:** Include carbon monoxide and nitrogen oxides (cause respiratory issues), carbon dioxide (causes climate change) and sulphur dioxide (causes acid rain).

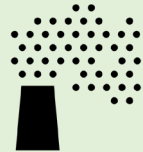


## AIR POLLUTION FROM INDUSTRY

**Rapidly industrialising countries:** Little or no regulation for factories, power plants and chemical facilities – so pollute freely.

**Common air pollutants:** Sulphur dioxide, nitrogen dioxide, carbon monoxide and volatile organic compounds (VOCs).

**European Union:** Decrease in air pollutants due to increased standards.



## AIR POLLUTION FROM CONSTRUCTION

**Respiratory issues:** Construction and demolition creates high levels of dust, aggravating asthma and bronchitis.

**Visibility issues:** Dust reduces visibility and can be dangerous for drivers and pedestrians.

**Global dimming:** Reduced sunlight reaching the Earth’s surface due to particulate matter such as soot and dust – reflects sunlight back to space.

**Cloud formation:** Those formed from polluted water droplets are more reflective, so more sunlight is reflected back to space.



## ACID RAIN

Burning fossil fuels in transport and industry releases sulphur dioxide which can lead to acid rain – this can damage buildings and can affect local waterways and soil – therefore affecting habitats.

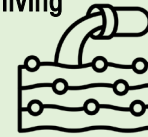


## CAUSES OF WATER POLLUTION

**Atmospheric pollutants:** Pollutants dispersed into the air from vehicles and industries, can lead to acid rain which can contaminate water and kill off certain species.

**Sewage:** Untreated sewage can enter urban waterways (particularly in developing world cities). For those living in poverty they have no choice but to still use the water supply as a drinking, cleaning and washing source, leading to disease and high death rates.

**Industrial waste:** In developing world cities industrial waste is often poured straight into water courses and municipal waste can end up in rivers as it is allowed to pile up along riverbanks, to be washed into rivers during flood events.



## WATER POLLUTION AND HUMAN HEALTH

**Pathogens:** Transmitted through polluted water causing intestinal infections, and common water-borne diseases such as dysentery and cholera.

**Metal toxicity:** Common elements found in polluted water include arsenic and chromium. In developing cities, many people grow crops on small plots of land and use this water for irrigation – so these metals bio-accumulate in the food source, causing health issues, particularly for young children and babies in the womb (can lead to developmental issues).



## DERELICTION

Cities that have seen deindustrialisation are left with abandoned old industrial sites with derelict buildings. These rundown sites are unsightly and attract anti-social behaviour.

**Contamination:** Many of sites will have used chemicals and metals in their processes – not usually cleaned up until they are redeveloped so ground and waterways can be contaminated.



## BROWNFIELD SITES

Derelict sites should be chosen over greenfield sites for development to protect green belt.

**Public-private partnerships:** City authorities and private developers will work together to remove toxins to get the site ready for development as part of urban regeneration schemes.



## EUTROPHICATION

Increasing growth of algae blooms will reduce oxygen levels in rivers and streams, which will result in the death of all species.

