

Urbanisation - the growth in the proportion of people living in urban areas.

In **2014**, over **50%** of the population lived in towns or cities.

Rapid urbanisation is occurring in **developing countries** e.g. Mumbai.

Suburbanisation - movement of people from city centres to the outskirts of a city.

Counter-urbanisation - movement of people out of the city into surrounding villages and rural areas.

Urban resurgence - the movement of people back into the city centre.

Megacity - an urban area with over **10 million** people living there.
First two were Tokyo and NYC.
2/3 in **developing countries**.

World city - a city that has global political and financial **influence**, e.g. London.
usually dominate international trade in their area.
High quality universities and research facilities.

Deindustrialisation in developed countries

- **Deindustrialisation** - the reduction of industrial activity in an area
UK deindustrialisation caused unemployment to rise over 3 million
- **Service economy** - during the 1980's, many service industries began to dominate developed countries
↳ contributes 78% of UK's GDP
- **Decentralisation** - businesses relocate to the suburbs where land is cheaper
↳ e.g. out-of-town retail parks

UK Government regeneration projects since...

1979

1. Urban development corporations

e.g. London Docklands
↳ 24000 new homes and 85000 jobs

2. Enterprise zones - established in areas with high unemployment to encourage start-ups, by reducing tax

3. City challenge - local authorities competed for government funding to regenerate deprived urban areas

4. Partnership schemes - government work with private companies to provide financial support for urban regeneration

URBANISATION

Reasons for urbanisation:

- **Economic**
↳ job opportunities, growth of businesses and shops
- **Social**
↳ better living standards
- **Technological**
↳ hotspots for tech advancements e.g. Silicon Valley
- **Demographic**
↳ large, wealthy cities attract migrants from all over the world



URBAN DRAINAGE

Catchment management

- ↳ a way of managing rivers and improving drainage systems by looking at the **whole river catchment**
- ↳ aims to **minimise** issues such as flooding, drought, and water pollution, and to improve river ecosystems

Hard engineering

- man-made structures such as **dams** and **reservoirs** prevent flooding and ensure a constant water supply.
- often **expensive** and can **disrupt natural systems** e.g. silt can be trapped behind dams, starving downstream areas of sediment.

Soft engineering

- works with **nature**
- **land use** management
 - ↳ planting **trees** to reduce flooding
 - ↳ avoid building on flood plains
- river restoration
- usually **cheaper** and can improve local environment

CHEONGGYEcheon

- **\$281 million** scheme launched in **2003**
- car use discouraged and freeway dismantled
- city temperature decreased by **2.5°C**
- **35%** increase in number of businesses
- **30-50%** increase in land value within 50m of the project
- increased public transport use
- **18.1 million** visitors by end of 2008

Aim to decrease flooding, water pollution and drought by **imitating natural drainage systems**, rather than using pipes. They are more sustainable because they work with the environment.

Low infiltration rates and high surface runoff means water enters rivers very quickly. This gives a **high peak discharge**, making flooding more likely.

Infiltration is low

- ↳ urban areas are covered in **impermeable** materials, e.g. concrete and tarmac
- ↳ this means that infiltration is low and so replenishment of **groundwater** stores is low
- ↳ this reduces river discharge in urban areas as groundwater feeds rivers

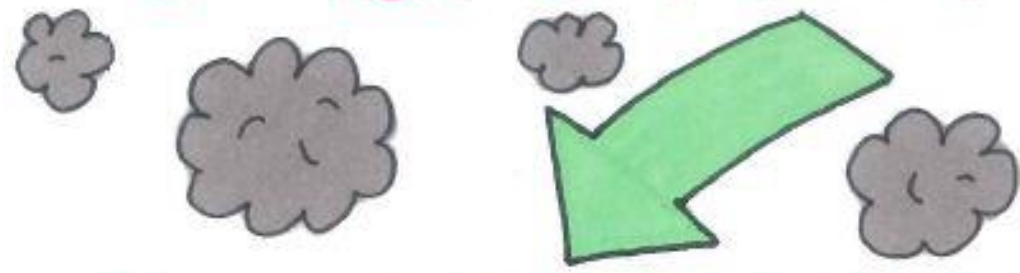
Surface runoff is high

- ↳ **precipitation** is more frequent and more intense in urban areas
- ↳ this increases **surface runoff**
- ↳ water is transported to rivers and streams through pipes

SUDS (Sustainable urban drainage systems)

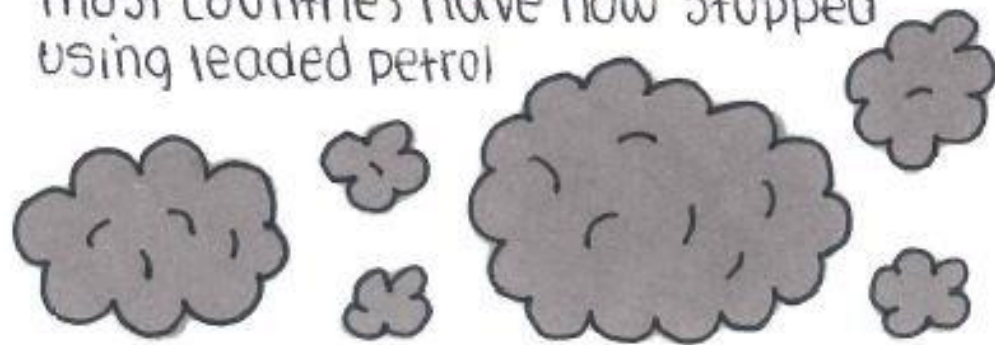
- **Vegetated trenches** - increase interception, infiltration & storage which reduces runoff & flood risk
- **vegetated roofs** - intercept rainfall and increase evapotranspiration
- **containers on roofs** catch and store water for reuse, decreasing risk of drought

URBAN ENVIRONMENTAL ISSUES



Atmospheric pollution

- ↳ in many **developed countries**, reliance on fossil fuels is decreasing, and so **air quality** has **improved**
- ↳ however, **car ownership** is increasing which can cause significant pollution
- ↳ many **developing countries** still rely heavily on **fossil fuels**
- ↳ increases in **industrial activity** and **car ownership**, combined with a lack of regulations leads to **severe pollution**
- ↳ urban air quality is **managed** in most developed countries by promoting public transport / reduce car usage and expanding green spaces in urban centres
- ↳ reducing air pollution in developing countries is very **slow progress** however, most countries have now stopped using leaded petrol



Water pollution

- ↳ cities have a **high population density** (meaning that a lot of waste is produced) and a high concentration of **factories** - pollutants and industrial waste can enter watercourses
- ↳ water pollution can damage **ecosystems** and contaminated water can cause **health problems** e.g. Cholera
- ↳ water pollution can be **managed** through catchment management and sustainable urban drainage systems (SUDS)
- ↳ in **developed** countries, water quality is strictly **monitored**
- ↳ in **developing** countries, there are few regulations and treatment facilities, meaning that water pollution is **common**



Urban dereliction

- ↳ urban dereliction occurs when **economic activity declines** and buildings become run-down
- ↳ dereliction often follows a **pattern**:
 1. manufacturing moves overseas and **decentralisation** of industry causes industrial decline.
 2. **Locals leave** the area in search for work.
 3. Shops are forced to close, leaving **empty buildings**.
 4. Empty buildings often leads to **vandalism** and **crime**.
- ↳ more common in developed countries where **deindustrialisation** has occurred
- ↳ **lack of investment** leads to large scale dereliction e.g. **Detroit**



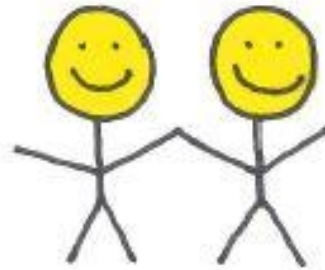
Environmental

- cities are responsible for **60%** of greenhouse gas emissions
- **renewable energy** sources can be used
- sustainable cities produce **little waste**, and manage their waste effectively
- cities where people walk, cycle and use public transport produce **less pollution**



Social

- sustainable cities provide **basic services** to all residents e.g. healthcare, education
- high quality of life and **liveability**
- plentiful of high quality **housing**
- enough **resources** to support the whole population e.g. have jobs



Economic

- economic sustainability involves maintaining **economic growth** without causing long-term negative effects
- sustainable cities will be wealthy, with low levels of **inequality**
- profitable businesses with well-paid jobs



SUSTAINABLE URBAN DEVELOPMENT

OPPORTUNITIES	CHALLENGES
<ul style="list-style-type: none">• People are densely populated so provision of services is easier and cheaper e.g. water• understanding of the importance of sustainability has increased ↳ led to increased research and investment• government invest more in urban areas than rural as there are more people	<ul style="list-style-type: none">• requires significant investment, which many cities cannot afford• cities are growing so public services need to expand rapidly• some people are unwilling to change habits e.g. driving less• some cities don't have sufficient infrastructure

6 Strategies for increasing sustainability

1. Reducing **car use** (London)
2. Increasing expanse of **green space** (Central Park)
3. Improving urban **waste disposal** (Singapore)
4. Increasing **renewable energy** (UK - plans to build tidal lagoon in Swansea Bay)
5. Reducing **water** use (water pressure reduced in Cape Town so less water was used)
6. Making **buildings** more **efficient**

Urban heat island effect

4 main causes

1. **Dark surfaces** with a **low albedo** absorb heat from the sun and slowly release it during the night as long wave radiation
2. **Air pollution** increases cloud cover and traps outgoing heat radiation
3. Heat from **human activity** e.g. cars
4. **Less evapotranspiration**
 - ↳ drainage systems and lack of vegetation mean there is little water to evaporate
 - ↳ evapotranspiration uses heat energy, hence increasing temperatures



The effect is **stronger at night** because surfaces continue to release heat energy. It is also **stronger in summer** because there is more solar radiation. Stronger when there is an **anticyclone** (causes clear skies and low winds) as more radiation reaches the ground.

Urban areas with a **higher temperature** than surrounding rural areas, e.g. London

The highest temperatures are found in **industrial areas**. There are pockets of **cool air** above parks and water (**temperature sinks**). Areas within the city with the same land use are the same temperature (**temperature plateaus**).

Microclimate: small scale variations in climate that occur in a restricted environment, in this case in an urban area.

URBAN CLIMATE

It **rains more** in urban areas because....

- ↳ the **air is warmer** and so can hold more water
- ↳ the air rises (**convection uplift**) then cools, causing **convective rainfall**
- ↳ increased **dust** and **pollution** encourages cloud formation, however this also increases the frequency of **fog**

It **doesn't snow** as often and when it does, the snow melts quicker because of warmer air temperatures; the same goes for **frost**.



Wind

Powerful gusts of wind are caused when wind is **channelled** down streets (the **canyon effect**).

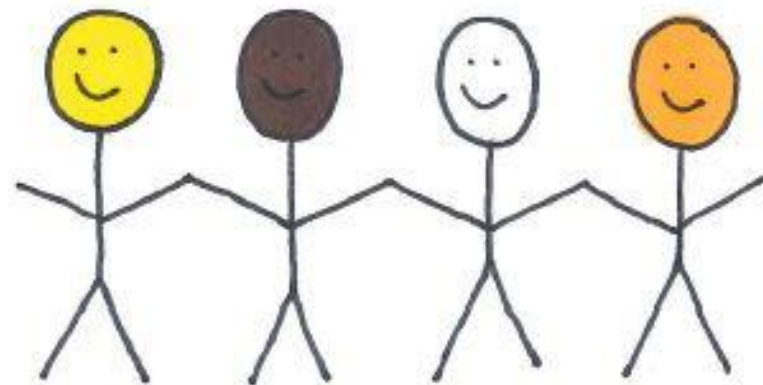
The **Venturi effect** is the squeezing of wind into an increasingly narrow gap, causing increased wind speed.

Average wind speed is usually **lower** in cities because tall buildings create **friction** that slows down moving air.

SOCIAL SEGREGATION \$ ECONOMIC INEQUALITY

- Cities tend to be **culturally diverse**, which can enrich a city's character and increase tourism, boosting the city's economy
- **Social segregation** is when different ethnic or cultural groups are separated from each other (diaspora)
 - ↳ this can be voluntary (e.g. living near a place of worship) or forced
- Social segregation causes **issues**:
 1. prejudice and discrimination
 2. some areas have **less access** to education and jobs, widening inequalities
 3. can lead to anxiety, and have negative impacts on **health** and life expectancy
 4. in developing countries, poorer areas may lack access to **facilities**
- **Managing** social segregation in urban areas:
 - ↳ governments encourage **political participation** of minority groups by encouraging them to vote
 - ↳ governments pass **laws** to prevent discrimination in the workforce
 - ↳ new developments can include affordable housing

- The **unequal distribution** of money amongst a population
- Economic inequality is worse in **developing countries** because they lack the resources to support the poorest citizens
 - ↳ developed nations have welfare states and basic income
- Economic inequality causes **issues**:
 1. **Crime**, drug use and violence
 2. political and social **unrest** e.g. rioting
 3. **health** problems
- **Managing** economic inequality in urban areas:
 - ↳ **transport** systems improve mobility and accessibility
 - ↳ affordable **housing**
 - ↳ **minimum wage** - help stabilise wage inequalities
 - ↳ governments can offer **subsidies** for new companies, increasing local **employment** opportunities
 - ↳ upgraded programmes for **slum settlements** in developing countries e.g. water supply



Case Studies: London and Mumbai



Particulate Pollution

Particulates are tiny particles of solids and liquids in the air. There are more particulates in urban areas because:

1. **Vehicle exhausts** - contribute **80%** of particulates in urban areas
2. **Burning** of cigarettes and coal
3. **Construction**, mining and quarrying
4. **Plants** and moulds

Particulates can cause **health problems** such as asthma and lung cancer.

Reducing air pollution: congestion charging

- ↳ people are charged to use their vehicle in certain places at certain times
- ↳ In **Central London**, congestion charging reduced emissions by **15%** in the first year

Reducing air pollution: public transport

- ↳ improved bus services e.g. bus only lanes
- ↳ park and ride schemes
- ↳ trams and railways avoid road congestion e.g. **Metrolink** in Manchester (over £1 billion)
- ↳ Council-run car sharing schemes in London

Reducing air pollution: alternative fuels

- ↳ **biofuels** have lower particulate emissions and can directly replace petrol and diesel
- ↳ **hydrogen buses** now run in many areas around London

Photochemical Smog

1. **Pollutants** come from burning **fossil fuels**.
2. **UV** light (sunlight) causes these pollutants to break down into harmful chemicals, which form photochemical smog.
3. Photochemical smog is a problem in many cities, such as Beijing. It's more common in hot, sunny climates.
4. Smog is linked to **health problems** e.g. breathing difficulties

Reducing air pollution: pedestrianisation

- ↳ vehicles are restricted from entering certain places at certain times e.g. in **London**
- ↳ can lead to shops receiving fewer customers

Reducing air pollution: legislation

- ↳ **UK Clean Air Act** reduced pollution from industry by introducing tall chimneys
- ↳ **Road Vehicles Regulations** reduce emissions by ensuring cars pass an emissions test on the MOT

AIR
QUALITY

