

Urban issues and challenges

Part A: The urban world

1. What is urbanisation?

Urbanisation is the increase in the proportion of the world's population who live in cities.

Urbanisation has taken place at different times and different rates in different parts of the world. The UK was one of the first countries in the world to become urbanised.

2. Why do cities grow?

Cities grow because of **natural increase** of a population (births minus deaths) and **rural-urban migration**.

More and more people are leaving rural areas and moving to cities. This is called rural to urban migration. People move because of push and pull factors. **Push factors** are things that **make people want to leave** rural areas (e.g. poor harvests, droughts, famine) and **pull factors** are the things that **attract people** to the city (e.g. well-paid jobs, higher standard of living, better medical facilities).

3. How does urbanisation vary around the world?

Today more than 50% of the world's population live in urban areas.

In most of the world's richest countries over 60% of the population live in cities.

In south and south east Asia around half the population live in towns and cities.

All but six countries in Africa have urban population of more than 20% (Niger, Uganda, Burundi, Ethiopia, South Sudan and Malawi).

The largest growth in urban population by 2050 will take in India, China and Nigeria.

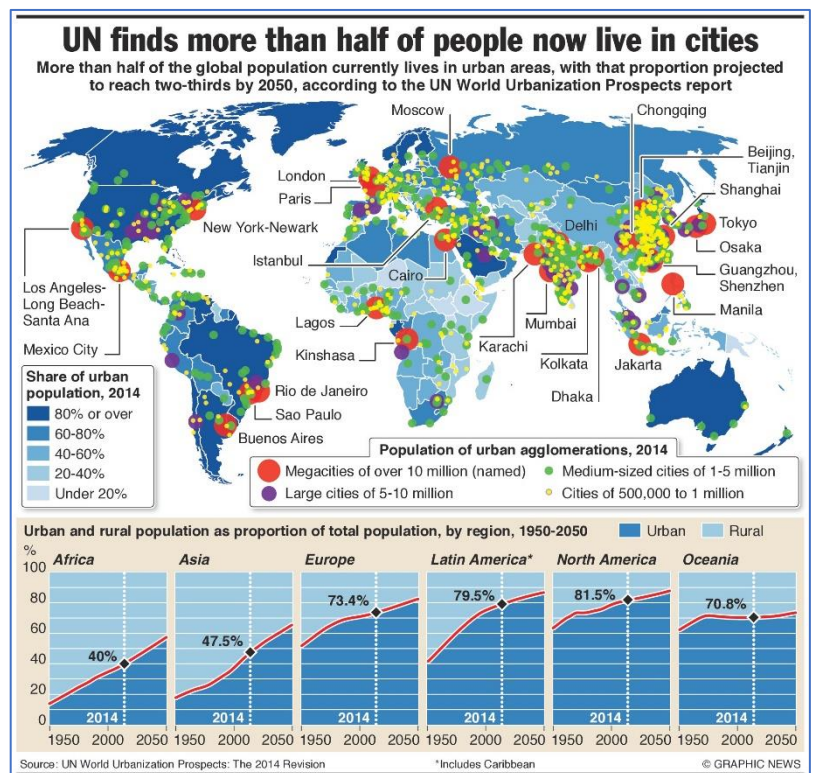
4. What are megacities?

These are cities with a population of over 10 million people. In 2015 there were 28 of these megacities (e.g. Tokyo, Mumbai, Rio de Janeiro, Los Angeles, London, Paris). The UN estimates that by 2050 there may be as many as 50.

5. Where is Lagos?



Lagos is Nigeria's largest city, in the continent of Africa. It lies in the South West of the country on the coast of the Gulf of Guinea close to Nigeria's border with **Benin** and is 5° north of the equator. The city was originally a small fishing village on an island until Portuguese settlers arrived in the 15th Century naming the area Lagos after the surrounding lakes and water sources. In 1991, the Nigerian government moved to Abuja, which became the new capital of Nigeria, though Lagos retained its importance as the country's centre of trade and commerce. Its population estimate is between 15-21 million people- but most people think it's around 20 million.



6. Why is Lagos an important city, both nationally and internationally?

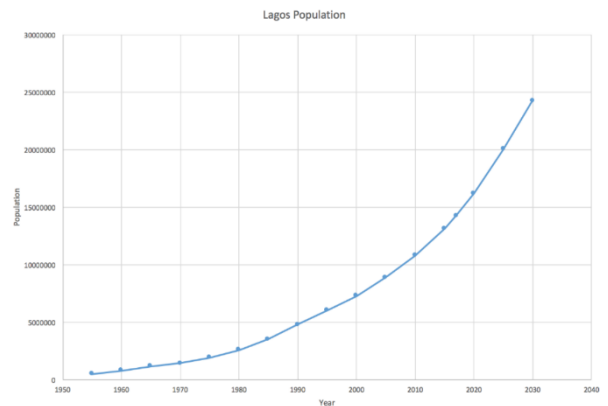
- It has a **major sea port and a major international airport.**
- About 80% of Nigeria's industry is based in and around Lagos and it is now the main financial centre in West Africa.
- Lagos generates around 10% of Nigeria's GDP (Gross Domestic Product)
- Most of Nigeria's oil exports leave from the port of Lagos – the oil generates 14% of Nigeria's GDP.

7. How and why has Lagos grown?

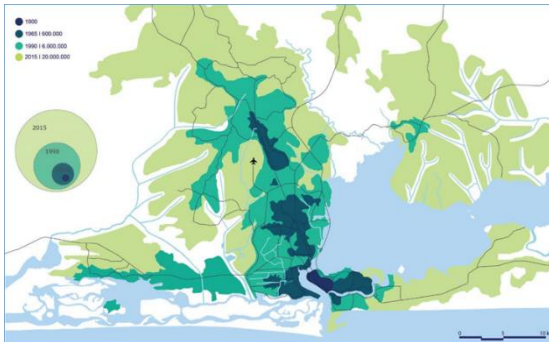
Each week tens of thousands of people move to the city in search of work.

People think that the city will provide many **opportunities** such as:

- **social** - better housing and services, e.g. healthcare and education
- **economic** - more jobs and higher wages
- **environmental** - better living conditions with a safer environment (less chance of natural disasters)



The physical area of Lagos has also grown as its population has. Lagos island was the original site of the settlement. Since then the city has grown on the mainland.



- The original site was on Lagos Island, surrounded by Lagos Lagoon.
- By 1960 the city had expanded northwards onto the mainland, following the line of the main railway.
- Lagos's expansion took off during the oil boom in the 1970s.
- The city continued to grow despite a fall in living standards during the 1980s and 1990s.
- It has expanded around the Lagoon to the north and west, and eastwards on the Lekki Peninsula.

8. What are the opportunities and challenges of urbanisation in Lagos?

Education: There are more schools and universities in Lagos than other areas, there are over 10 universities in Lagos state alone. Education is seen as a passport out of poverty and allow people to be able to get into industries such as finance, film, fashion and business.

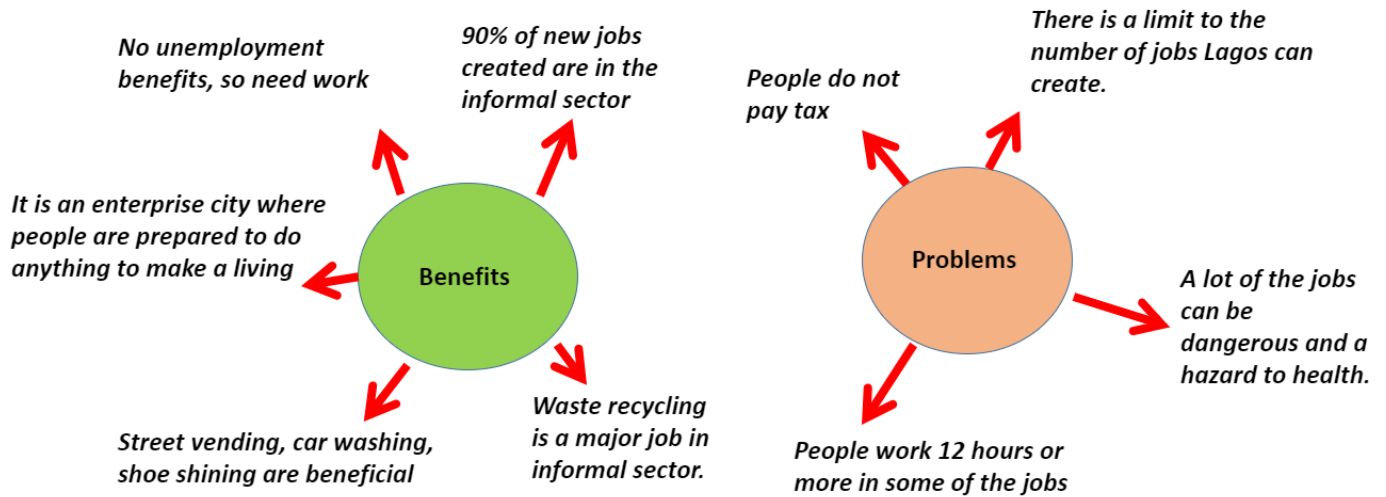
Employment: there are better employment opportunities with higher pay and of a wider range in Lagos, that aren't largely in the primary industry as found in rural areas e.g. farming.

Healthcare: Nigerian's can often view cities as a place where they can access basis health care facilities that will increase their life expectancy. Although they do have to pay for healthcare which can cause future problems if they cannot pay for these services.

Transport: Lagos is investing in the Lagos Rail Mass Transit System. It was announced in 2008 and phase 1 should open in 2022. There are already taxis and public buses. Congestion remains a big problem, however.

Despite the difficulties of the informal industry, these industries offer poor often uneducated people a foothold in the city. They can earn money and start to improve their quality of life from that point:





Opportunities or challenges? Olusosun Rubbish Dump:

- + Each day the workers sort 3,000 tonnes of waste by hand, picking out valuable items to sell
- + without a dump, a lot of reusable items would go to waste, people in Lagos can save money by buying recycled goods
- + There are shops, restaurants, bars, cinemas and a mosque at the dump
- often workers breathe in dirty fumes from the dump which can cause health concerns
- 10,000 tonnes of rubbish produced in Lagos each day
- Electric waste imported to Nigeria is dumped at Olusosun



People who move think that they will have a better quality of life. Unfortunately, cities such as Lagos face many challenges and the people who move there do not always have a better quality of life. Some of the **challenges** they may face include:

- **social** - poor housing conditions and crime
- **economic** - low wages or unemployment
- **environmental** - polluted drinking water and a lack of sanitation

Challenges:

Waste: there is no system to deal with waste from factories; large rubbish dumps contain illegal and toxic waste

Pollution: factory emissions are not controlled leading to air and water pollution

Services: lack of sanitation in informal settlements, no sewage system so raw sewage enters into the lagoon; communal toilets with up to 15 households, electricity is illegally tapped into from the poorest regions leading to power cuts and shortages

Housing: only the rich have piped water supplies; the poor build informal settlements- accommodation built out of any material available and shared by numerous people.

Employment: there are not enough formal employment opportunities which leads to unemployment and a growth in the informal sector.

8. What are squatter settlements?

A problem of rapid **rural to urban migration** is the development of squatter settlements (slums/informal settlements). Informal settlements are an area of poor-quality housing, lacking in amenities such as water supply, sewerage and electricity, which often develops spontaneously and illegally in a city in a low-income country or newly emerging economies.



Makoko slum in Nigeria's commercial capital Lagos is built on stilts and was founded as a fishing village in the 19th Century.

It is home to more than 100,000 migrants from West African countries; it is referred to as the Venice of Africa. Makoko is on prime waterfront property close to the major port and Lagos Island. It is an ideal site for modern development and the people who live there are generally doing so illegally and are at risk of floods and waterborne disease. Others argue that Makoko is a well-established and historic community with clear community structures in place, it should be improved rather than demolished.

A problem of rapid **rural to urban migration** is the development of squatter settlements (slums). The squatter settlement is unplanned and has the following characteristics:

- overcrowded, noisy and smelly
- houses are made from cardboard, wood, corrugated iron, plastic sheeting and metal from oil drums
- lack of sanitation, clean drinking water and open sewers
- pollution and disease are common
- thousands of workshops and people employed in the informal job sector

9. How can squatter settlements be improved?

Squatter settlements can be improved through urban planning. The plan to improve in two ways:



Urban Planning 1: Makoko Floating School:

Makoko Floating School is a prototype floating structure, built for the historic water community of Makoko, located on the lagoon heart of Nigeria's largest city, Lagos. As a pilot project, it has taken an innovative approach to address the community's social and physical needs in view of the impact of climate change and a rapidly urbanizing African context. Its main aim is to generate sustainable, ecological, alternative building systems and urban water cultures for the teeming population of

Africa's coastal regions.

Urban Planning 2: Eko Atlantic:

Eko- Atlantic: Lagos is now building a city on the coast called Eko-Atlantic by land reclamation, it is destined to be the new financial hub of West Africa. The building of Eko-Atlantic may prompt the government to deal with the problem of flooding in local homes and businesses as it would now adversely affect Eko Atlantic. The Project will bring significant direct investment into Lagos; the ambitious project is being built on three and half square miles of land reclaimed from the Atlantic Ocean and is expected to provide accommodation for 250,000 people and employment opportunities for a further 150,000. The development will offer new habitable space in an overcrowded city where space is rare. The Project will be good publicity for Lagos wishing to attract more TNC's.



Global examples for informal settlement improvements:

Dharavi is called Vision Mumbai. This involves replacing squatter settlement housing with high-quality high-rise tower blocks of flats. The improvement of Dharavi has still not begun.

Brazil is an example of a Newly Emerging Economy (NEE). In **Brazil**, squatter settlements have been improved through self-help scheme. This is when residents improve their own home with the support of the local authority. For example the local authority may provide cheap building materials or a loan for residents to purchase them. Residents make all the improvements to their homes themselves.

Part B: Urban changes in the UK

Population distribution describes how people are spread out. The population of the world is spread out very unevenly.

Population density describes how many people there are in 1km squared.

10. Where do people live in the UK?

In 2015, the population of the UK rose to over 65 million people. London is the UK's largest city and Birmingham is its second largest city.

Scotland has the lowest population density at 68 people per km² whereas England has the highest population density at 413 people per km².

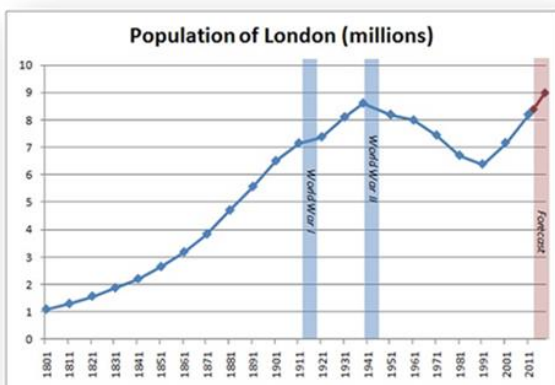
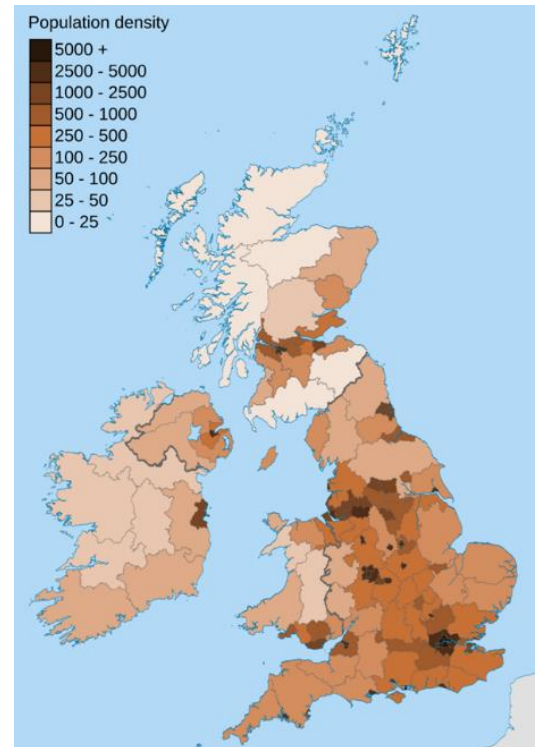
11. Where is London?

London is located in the south east of the UK. London was the chosen site by the Romans when they conquered in 43AD.

They built a walled settlement on the north bank of the Thames to defend themselves against the defeated Britons.

The Thames is a tidal river. At high tide, ships were able to navigate up the river to London and the city became a port.

New docks were built along the river increased ships using it as a port. London's importance as a centre of trade and commerce grew and new manufacturing industries developed.



12. How and why has London grown?

London's population is in a period of growth. It grew from just over 1 million in the 1801 census, to a peak of over 8.6 million in 1941. Following this period the population of London went into decline, slipping to just over 6 million in

1991. Since then government initiatives and a booming economy have allowed the population to grow to 8.3 million in the 2011 census, and it is predicted to continue to grow. There are 3 factors at play influencing the overall size and rate of growth of London's population;

1. Internal (within the UK) migration has been negative; that is the numbers of people moving out of London has been greater than the number of UK residents moving in. This balance has got smaller over time.
2. International net migration has always been positive during the time period shown, so there have always been more foreign born people moving into London than out of it
3. Natural Change has been positive, so births have been above deaths and this has boosted the population size.

When the balance is taken between these 3 factors it can be seen that London's population has had a **POSITIVE BALANCE** year on year, with London gaining over 100,000 people a year between 2008 and 2013.

13. Why is London an important city?

London can be called a '**World City**' because it is considered to be an important city in the global economic system.

London is a **transport hub** for many other destinations in the UK. The train line map shows that London is connected to all other major cities in the UK by rail networks. There is also the Underground, Overground and bus services. London is also well connected to Europe with the Eurostar, Channel Tunnel and ferry crossings.

London is the national and international centre for media and communications, education- universities and research, legal and medical facilities and culture entertainment and tourism.

TOURISM: London is a hot spot for tourism in the UK with attractions such as Buckingham Palace, the London Eye, London Dungeons and the O2 Arena. London is the most popular destination for tourists in the UK and in 2009 tourists visiting London spend £16.6 billion. The British Museum in London was the most popular attraction in the UK in 2010 welcoming 5.8 million people through its doors. The Royal Family generate close to £500 million every year for British tourism with The Tower of London, Windsor Castle and Buckingham Palace being the most popular royal destinations.

FINANCIAL HUB: Average income in London is far higher than the rest of the country. The median average UK salary is currently £30,420, while the **City of London** has an average salary of £48,023. The City of London is an international leader in commerce (business) and it famous for banking, finance, insurance and business services.

CULTURE: London is a centre for culture in the UK and the world. It is home to a wide variety of arts, music, museums, festivals and other entertainment. Some even call London the 'culture capital' of the world! London has four UNESCO world heritage sites: Tower of London, Maritime Greenwich, Westminster Palace, Kew's Royal Botanical Gardens. There are more than 300 languages spoken in London – more than any other city in the world! Around 250 festivals take place in London every year including Europe's biggest street festival – the Notting Hill Carnival that attracts nearly 1 million people.

INTERNATIONAL HEADQUARTERS: London is one of the most important financial centres in the world. Over half of the UK's top 100 listed companies (the FTSE 100) and over 100 of Europe's 500 largest companies have their headquarters in central London. Examples are: BBC, Cadbury, British Airways, HSBC, Marks and Spencer.

14. What opportunities are there in London?

Social

- There are more than 300 languages spoken in London- more than any other city in the world.
- 250 festivals take place in London every year including Europe's biggest street festival – the Notting Hill Carnival which attracts nearly 1 million people.

Economic

- The average income in London is far higher than the rest of the country. The median average UK salary is currently £27,531, while the City of London has an average salary of £48,023.
- London is one of the most important financial centres in the world. Over half of the UK's top 100 listed companies (the FTSE 100) and over 100 of Europe's 500 largest companies have their headquarters in central London.

Environmental

- London has four UNESCO world heritage sites: Tower of London, Maritime Greenwich, Westminster

Palace and Kew's Royal Botanic Gardens.

- London is one of the greenest cities in the world with lots of green spaces. There are 8 Royal Parks in central London including: Green Park, St James's Park, Greenwich Park, Hyde Park, Kensington Gardens, Regent's Park, Bushy Park and Richmond Park. Almost half the city- 47% is green space.
- Transport for London is working to make transport in London more sustainable. They have worked to reduce emissions by introducing a congestion charge, public cycle hire scheme (Santander Cycles) and hybrid buses.

15. What challenges are there in London?

Whilst London is a fantastic city and a great place to live and work for many reasons, it is not without its challenges. There are huge variations in wealth and access to jobs across London, and the high cost of living of London poses problems for many of the people who live there.

Social and economic challenges

London is an incredibly unequal city. Billionaires live in very close proximity to people who survive on less than a living wage.

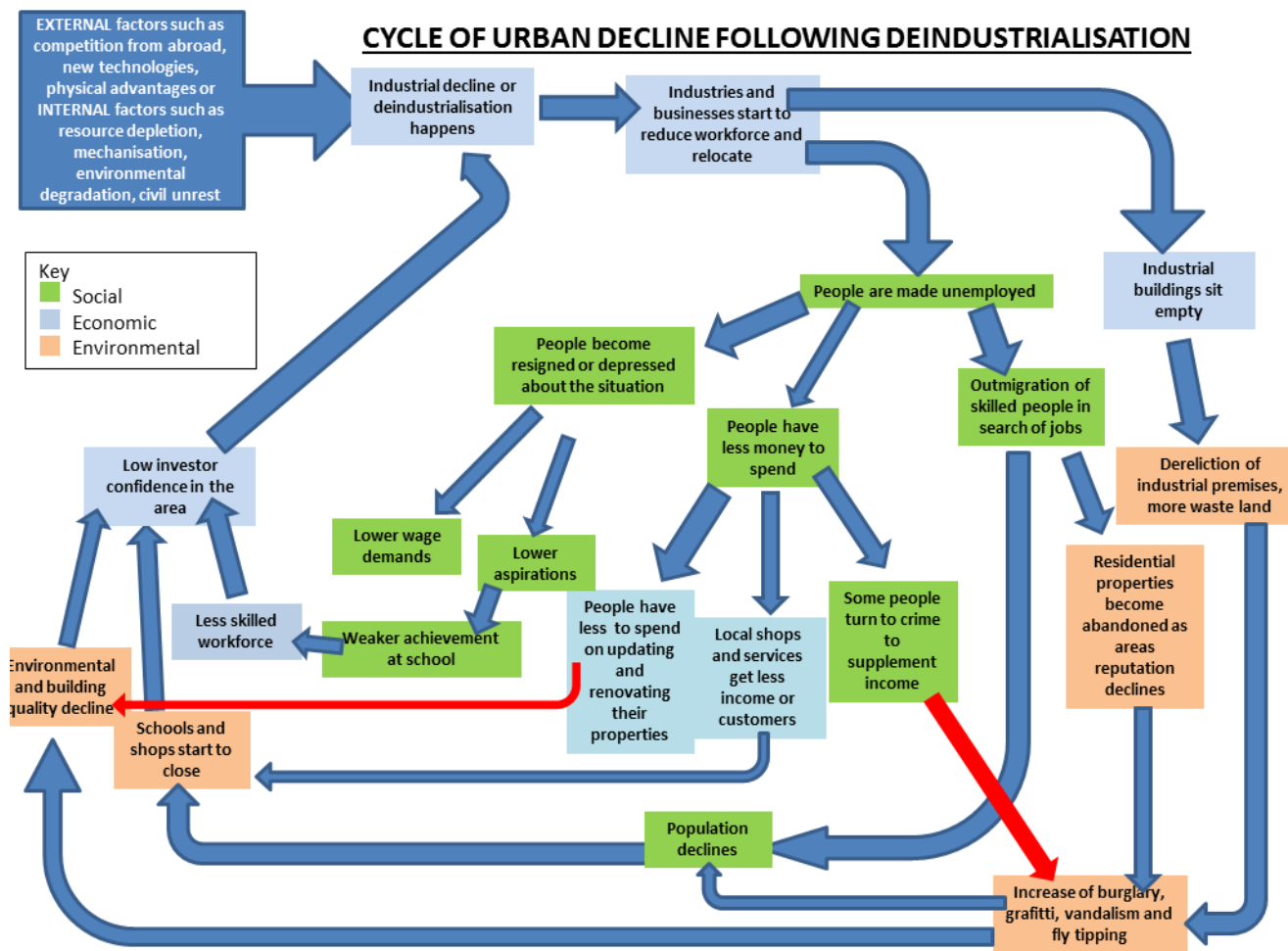
- 16% of Londoners are in the poorest tenth nationally, whilst 17% are in the richest tenth of people in the country
- The richest 10% of people in London have 60% of all assets whilst the poorest 80% of the population share just 20% of all asset wealth in London
- The top tenth of employees in London earn around four and a half times as much as the bottom tenth.

These huge differences in wealth result in big differences in people's access to and success with in housing, education, health and employment.

Urban decline and deprivation

Urban decline is the deterioration of the inner city often caused by lack of investment and maintenance. It is often but not exclusively accompanied by a decline in population numbers, decreasing economic performance and unemployment.

Urban deprivation is a standard of living below that of the majority in a particular society that involves hardships and lack of access to resources. Places suffering from urban deprivation have visible differences in housing and economic opportunities between the rich living alongside poor people.



16. What is urban sprawl?

Urban sprawl is the unplanned growth of urban areas into the surrounding countryside. **The rural-urban fringe** is an area of transition where there's a mix of urban and rural land use.

As London has grown, it has sprawled outwards, merging with surrounding urban areas. This has affected the rural-urban fringe:

- Large housing estates have been built on rural **greenfield land**. This provides a pleasant environment for people to live but means that open spaces are lost and ecosystems damaged or destroyed.
- Out-of-town developments such as The Bluewater Shopping Centre take advantage of cheaper land outside the city and are easily accessible to lots of people. But large areas of rural land are lost when they are built and they can lead to air and noise pollution and traffic congestion, as people often travel to them by car.

Commuter settlements are places in the rural-urban fringe where the majority of the population leaves the town each day to work elsewhere. This can cause challenges

- New housing developments can affect the character of rural settlements and damage the environment
- Demand for houses increases house prices
- Businesses in commuter settlements may suffer, as the majority of the population are absent a lot of time and may spend their money where they work rather than where they live.
- Large numbers of commuters can increase pollution and cause traffic congestion and parking problems.

17. CASE STUDY: UIC - London - Regeneration

The London Olympics of 2012 was a fantastic sporting spectacle and put the spotlight of the World on our capital city. Part of the aims of the Olympics was to completely transform an area of East London that is lagging behind the rest, East London. The idea was to leave a lasting legacy or impact not just for sport but for the urban area in the East of London.

The London 2012 Olympic Legacy was a plan to make sure that the 2012 Olympic and Paralympic Games had LONG TERM BENEFITS.

This legacy was to cover 4 main areas;

1. Economic – supporting new jobs and skills, encouraging trade, inward investment and tourism
2. Sports – continuing elite success, development of more sports facilities and encouraging participation in schools sports and wider
3. Social and volunteering – inspiring others to volunteer and encouraging social change
4. Regeneration – reuse of venues, new homes, and improved transportation

The key for this unit is Legacy point 4 – urban regeneration. Urban Regeneration is the whole sale improvement of the buildings and infrastructure of an area. The Olympic athletes village was converted to a new housing area in London.

The areas hosting the Olympics like Stratford and nearby Tower Hamlets were in dire need of regeneration as they had;

- a lot of abandoned old industrial sites
- low achievement at school in terms of GCSE points score
- industrial wastelands
- higher than average unemployment than the rest of London
- higher deprivation and poverty for the people that lived there
- Lower household incomes than the London average

	Pros	Cons
Socially	<p>The athletes' village has been relaunched as a housing estate called the East Village, the rooms have had kitchens added and walls knocked through. Almost half of these 2,818 new homes (40%) will be affordable. Eventually the whole Olympic Parkland will become five new neighbourhoods housing 8,000 people.</p> <p>The Olympics has helped schools in the area – there was a shortage of spaces but a new school opened in the grounds of the park. Chobham Academy will cover all levels of education.</p> <p>The aquatics centre now uses its 50m pools as facilities for the community and schools, as well as elite athletes.</p> <p>Unemployment OVERALL fell across London during the Olympic period</p>	<p>Anne Power at the London School of Economics said "The 'affordable rents' for the 2,800 new homes will be unaffordable to Newham's poorest households."</p> <p>Rushanara Ali, MP in the Olympic borough of Tower Hamlets, said: "The impact of the infrastructure investment has been really fantastic... But – and there's a big but – in my borough unemployment actually went up during the Olympics."</p> <p>During the construction of the Olympics, very few jobs were created for local people. There are still high levels of unemployment in the borough and it was a missed opportunity to train people up for work. Tower Hamlets got very little out of the Olympics. (Rushanara Ali, MP)</p> <p>Many people in the boroughs surrounding the Olympic Park remain in poverty</p> <p>Properties for poorer people had to be demolished to make way for the site, 450 Housing Association flats were torn down for example.</p>
Economic	<p>Stratford got a Tube station to help connect the area to the rest of London - Stratford is now second only to King's Cross as the most connected part of London.</p> <p>The infrastructure has been improved. As well as two Underground lines, a high-speed "javelin" train to King's Cross</p>	<p>The Olympic stadium is estimated to have cost £701 million pounds, almost 3 times the original estimate (source). This angered many local people.</p> <p>The total bill for the Olympics was £8.77 billion of tax payer's money. That was £5 billion over budget.</p> <p>Existing businesses had to move, including H. Forman and Sons, a salmon-smoking factory with 50 employees</p>

	Pros	Cons
	<p>and the Docklands Light Railway, it may soon be a stop-off for the Eurostar to Paris.</p> <p>The Olympics brought more than £9bn of investment to east London, much of which went into transport. Lloyds TSB estimated that the Olympics will generate £10 billion in extra income for the UK economy</p> <p>ALL of the Olympic venues have been sold. The final building to be sold off was the £300m media centre, which will now primarily house Infinity – a data company who want to store information for large corporations.</p>	Rents and property prices have gone up as a result of the Games
Environmentally	<p>Many of the grounds in the Olympic Park have been kept as parkland and are open to the public for use as a picnicking and play area. New green spaces and wildlife habitats were created, including ponds, woodlands, and artificial otter holes.</p> <p>The stadiums were made of at least 25% recycled materials</p> <p>The River Lea that runs through the Olympic Park was improved as has the quality of its water. Green areas were placed along the banks of the river.</p> <p>The urban wasteland of the Lower Lea Valley was cleaned up, with soil being cleaned on site.</p> <p>The Olympic Site was built largely on 560 acres of brownfield land, property that had been neglected, unused, and contaminated.</p> <p>Researchers helped choose sustainable & biodiverse vegetation suited to an urban environment, including 4,000 trees, 74,000 plants and 60,000 bulbs and 300,000 wetland plants</p>	<p>Much wildlife had to be relocated; 4,000 smooth newts, 100 toads and 300 common lizards as well as fish including pikes and eels were moved by the Olympic Delivery Authority.</p> <p>Many of the materials for the stadiums and the Olympic Park came from overseas</p> <p>The games produced 3.3 million tons of CO2</p>

Part C: Sustainable urban development

18. How can we make urban areas more sustainable?

<p>Urban Sustainability =</p> <ol style="list-style-type: none"> Protecting the environment for future generations Helping the economy to get better by providing better jobs (particularly for poorer countries and people) Protecting communities and improving people's quality of life

Urban areas need to become more sustainable. **Sustainable living** means doing things in a way that lets the people living now have the things they need, but without reducing the ability of people in the future to meet their needs.

However, big cities need so many resources that it's unlikely they'd ever be truly sustainable. But things can be done to make a city and the way people live there more sustainable:

- 1. Water conservation schemes** (collecting rainwater for use on gardens or for flushing toilets, installing toilets that use less water to flush, installing water meters so that people have to pay for the water that they use)
- 2. Energy conservation schemes** (promoting renewable energy sources over traditional coal or gas fired power stations, government incentives to make homes more energy efficient, making sure that new homes that are built meet minimum energy efficiency requirements, encouraging people to use less energy at home e.g. turning off lights when they are not needed)
- 3. Creating green spaces** e.g. parks which encourage people to exercise more and use alternative transport, make people happier, reduce the risk of flooding, reduce air pollution
- 4. Waste recycling** (collection of household recycling boxes, recycling facilities for larger items, websites such as Freecycle, where items are offered for free so they can be used by others)

Urban sustainability: London Fact Sheet

On average in London, each person uses enough energy (electricity, petrol etc) to give off 5.9 tonnes of carbon dioxide per person per head. They call this its 'per capita CO₂ Emissions'.

This is lower than the average for the rest of the UK and is mainly because Londoners take buses and tubes more than those in other towns and cities.

Over 70% of our energy comes from gas and coal, both of which give off a lot of carbon dioxide emissions. We use very little renewable energy such as wind or solar power. This is less than 10% of all the energy we use.

In London, people use an average of 167 litres of water per head per day. Most of that comes from rivers or reservoirs.

London is in the driest part of the UK and regularly has hose pipe bans if there is a shortage of water. London has a big problem with water leaks. Cracked pipes mean that enough water leaks out onto roads to fill Wembley Stadium every 36 hours.



Each Londoner produces an average of 2.2kg of waste per day. This is quite high compared with the rest of the world. We are very bad at recycling it. Currently only 34% of our waste is recycled, which is lower than the UK average of 43%. Our landfill sites are also full up and we have to ship some of our waste to China.



People in the richest 10 percent of people in London earn 4 times more than people in the poorest 10 percent. Many people find it very hard to afford to buy a house in London because the house prices are so very high.



Although London has many traffic problems and air pollution issues linked to traffic, the number of miles driven per person has fallen by 37% in the past 10 years. This is partly because of the improvements in public transport and policies such as the Congestion Charge that aim to reduce traffic. Also, more and more young Londoners are choosing not to drive or own cars. Having said this, London is still one of the most polluting cities in the EU, having reached their pollution levels for the year by mid January.



The population density in London is 1,510 people per square kilometre. This is quite low, meaning people have a large amount of land per person. It is partly because a large part of London is parks such as Wandsworth Common or Hyde Park.

A 'greenbelt' is a line drawn around the edge of the city to stop it growing further out into the countryside. Some people think this line will be moved further out as London's population continues to grow.

Eco-Homes

One way that urban areas can become more sustainable is by developing **eco-homes**.

Eco homes are homes that have a minimum impact on the environment. The main features of an eco home include:

- **Energy-efficient design** e.g. facing the building south to maximise the amount of sunshine reaching each building and having double glazing and high levels of insulation.
- **Renewable materials** e.g. timber.
- **Self-sufficient heating and power** e.g. solar panels can provide hot water and electricity.
- **Low energy consumption** e.g. recycling heat used for cooking and heating and having low-energy appliances and low-energy light bulbs.

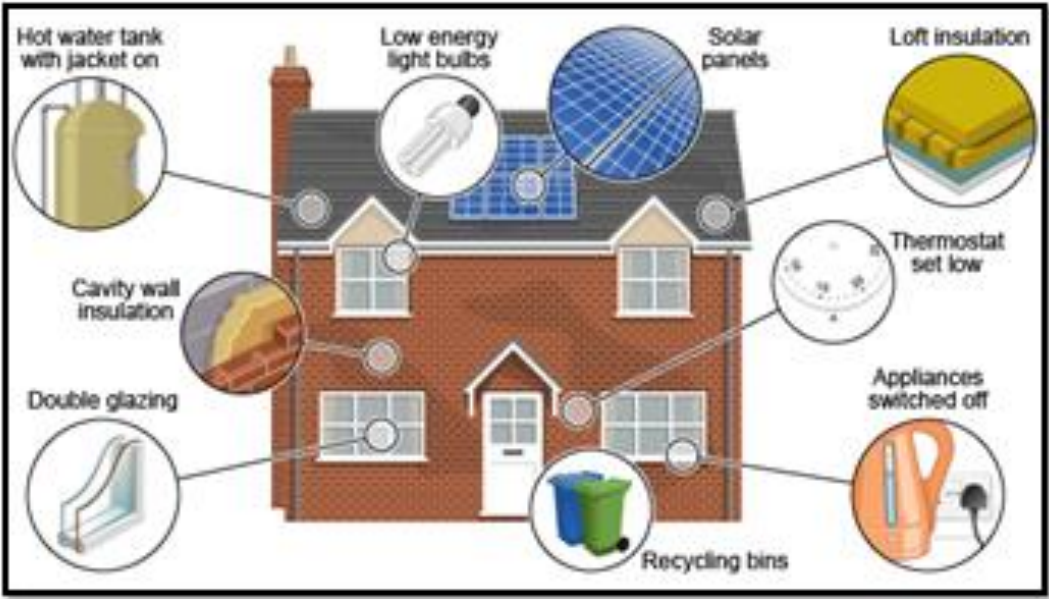


Key terms

Carbon-Zero: does not use resources that create carbon dioxide.

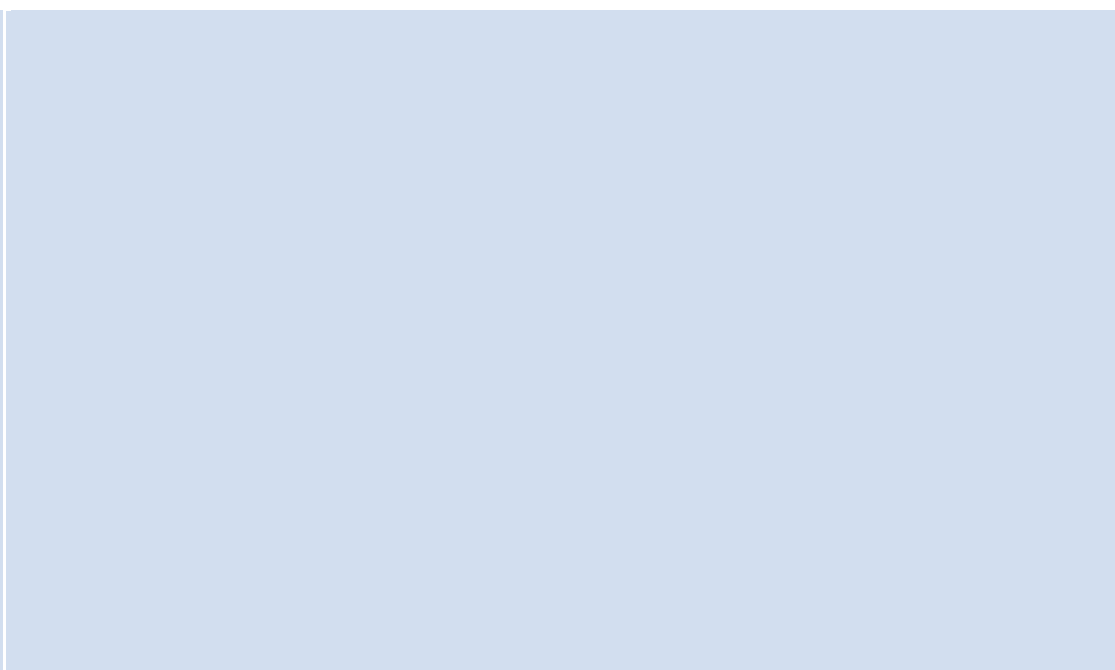
Brownfield land: old industrial or housing area that has become rundown or derelict.

Ecological footprint: the impact of an individual on the Earth (measured in hectares per person).



Hydrogen Buses

<p>London's main response to traffic congestion and pollution was to create the congestion charge zone in 2003.</p> <p>The congestion charge zone has created a 'low emission zone' inside central London.</p> <p>This means that any vehicle travelling into central London apart from fuel-efficient vehicles, must pay a daily fare to enter the zone.</p> <p>Since 2003 there has been a 6% increase in bus passengers</p>	<p>The Barclay's cycle hire scheme was launched in 2010 with 6000 bikes and 400 docking stations. The aim is to increase cycling by 400% by 2026 to reduce emissions from cars and other transportation.</p> <p>To improve the uptake of people using the scheme London built the Barclay's cycle superhighways – 12 routes currently run through London which are separated cycle lanes – away from other traffic to improve safety.</p> <p>Despite reducing emissions many say the scheme could be more successful at current most bikes are used 3 times a day</p>	<p>London's new Hydrogen buses were first introduced in 2012 in time for the Olympic games. The buses use hybrid technology and it produces 40% less Carbon Dioxide and is 40% more fuel efficient than previous London buses.</p> <p>The buses are cleaner, quieter and more efficient. Transport for London aim to increase bus transport by 60% by 2025 from 2005. At the moment there are only 8 hydrogen hybrid buses but Transport for London hopes to increase this to make up 20% of all buses by 2025.</p>
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<p>as a result of the zone. The zone also creates £148 million a year, money which is invested in improving London's transport network</p>	<p>on average whereas in Barcelona's bike scheme – bikes are used 10 times a day.</p>	
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19. Case study: managing rapid urban growth in a sustainable way in Curitiba



Curitiba is a capital city of the Parana state in Brazil. Nearly two million people live there. The city has had an urban master plan since the 1968. It is an excellent example of managing urban growth in a sustainable way. The master plan includes social, economic and environmental programmes. It includes:

- Creating and retaining parks and green space beside the rivers. This acts as a floodplain. When the Iguazu River floods, some areas created are used as boating lakes.
- The green spaces being dedicated to different ethnic and immigrant groups.
- Urban growth is restricted to corridors of growth - along key transport routes. Tall buildings are allowed only along bus routes.
- A **bus rapid transit system operates**. This is cheaper to run than a tube system. Some employers subsidise their employees who use it. 80% of travellers use it.
- The bus rapid transit system uses triple section bendy buses. It carries two million passengers a day. The bus fare is the same wherever you go. No one lives more than 400 metres from a bus stop.
- "Lighthouses of Knowledge". These are free educational and internet centres.
- A green exchange programme. The urban poor bring their waste to neighbourhood centres. They can exchange their waste for bus tickets and food. This has many advantages, for example the urban poor areas are kept clean, despite waste trucks not being able to reach them easily.
- COHAB, the public housing programme, is providing 50,000 homes for the urban poor

