Theme 1:

Population and settlement

Chapter 1

Population dynamics

Learning Summary

In this chapter you will learn about:

- *Factors influencing the density and distribution of population and migration*
- *Reasons for rapid increase in the world's population in recent times*
- *The main components influencing population growth*
- *The relationship between population growth and resources and why problems may result in some areas*
- *Contrasting patterns of population growth in different world areas*
- *The consequences of different patterns of population growth*
- *Reasons for different types of population structure*
- *The major physical, economic and human influences on population density and population distribution*
- *Reasons for population migrations*

World population

- The world's population in November 2012 was estimated to have passed 7 billion and this figure will continue to grow. However, the rate of growth of the world's population is slowing down – the rate of growth today has almost halved since reaching a peak growth rate of 2.2 % in 1963.
- World births have levelled off at about 134 million per year since the mid-1990s, and are expected to remain constant. However, deaths are only around 56 million per year, and are expected to increase to 90 million by the year 2050.
- Since births outnumber deaths, the world's population is expected to reach nearly 9 billion by the year 2042.
- Population projections/estimates are not always accurate. The graph that follows was used in the November 2002 Geography exam – have a look at the estimate/projection for 2013.
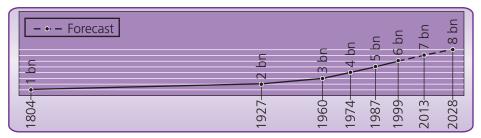

Figure 1   World population growth

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Some important terms and their definitions

- *Population distribution* is a description of the spread of the human population across Earth. The distribution is very uneven – most of the world's population lives in only one third of the available land area.
- *Population density* is the number of people per unit of area usually per square kilometre. This may be calculated for a county, a city, a country, or the entire world. It is found by dividing the total population of a country or region by its land area (in square kms).
- *Birth rate* is the average number of live births for every 1000 people in a country.
- *Death rate* (Mortality rate) is the average number of deaths for every 1000 people in a country.
- The difference between the birth and death rates is either the *natural increase* or *natural decrease*.
- The *optimum population* for a region or country is a level of population which is ecologically sustainable. It is linked to the *carrying capacity* of the region or country. If there are too many people the resources will be used up and problems will appear – in food supply and water for example. At this point, the carrying capacity will have been exceeded and living standards for many people will start to decline.
- At that point, a region or country is said to be over populated. Below this point a country can be said to be under populated. Therefore, the term *overpopulation* is used where the number of people exceeds the carrying capacity of an area, while the term *under population* is where the number of people is below the carrying capacity of an area.

> Carrying capacity is the amount of resources in a country that can support the country's population.

Population density

Population density describes the number of people living in a given area, usually a km². It can be used on a variety of scales from continents, to countries to regions within a country. It is calculated by dividing the *total population* of one of these by the *total area*.

On any population density map of the world it is possible to pick out areas that have high and low population densities. The areas with high population densities are in the following regions.

> India and Bangladesh – along the Ganges river, the North China Plains, the China Sichuan Basin, the Nile river and its delta in Egypt, Southern Japan, Western Europe, the Indonesian island of Java, Central America (especially El Salvador, the Americas' most densely populated nation), and the United States' BosWash (the area between Boston and Washington in the NE of the USA) – an area where conurbations have grown and merged together creating a **megalopolis**.

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The factors affecting population distribution and population density

The Earth's land surface is about 30 per cent of the total Earth's surface – the rest being water. However, only about 11 per cent of the land area is comfortably habitable by people. The factors can be divided into two groups – *Physical (Natural)* and **Human**.

- The *physical (natural) factors* are factors involving the natural environment and include climate, water supply, natural resources, relief, natural vegetation and soils.
- The *human factors* are factors that are a result of human activities and these may be economic, social (including cultural) or political. The economic factors include transport and money (sometimes called capital) to invest in industry. The social factors include housing, health care and education. The political factors include government investment in the infrastructure of an area such as in roads, railways, airports and sea ports, and land reclamation.

Figure 2 shows some areas of the world with high population densities. You may be given maps like this on a global, continental or country scale and be asked to describe the distribution of the variable shown on the map – in this case areas with a high population density. You should use the information on the map to identify the continents, the locations within the continents relative to the compass location and whether they are near to, or far from, the coast; as well as their location relative to the lines of latitude shown on the map.
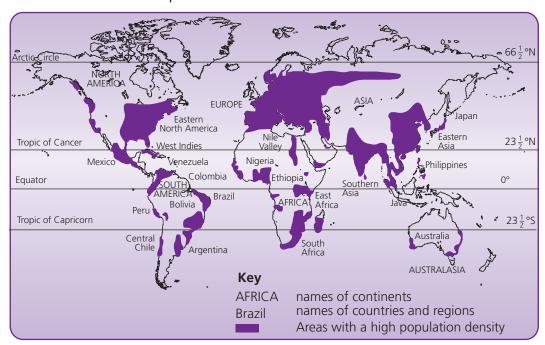

Figure 2

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The physical/natural factors

Climate

There are 3 major climate zones covering the Earth – Polar, Temperate and Tropical.

People tend to avoid living in polar areas because of:

- the long periods of freezing temperatures in winter
- the very short growing seasons for plants.

These areas, therefore, have ***very low population densities*** and contain people who are traditional hunters and gatherers such as the Inuit of northern Canada, Alaska and Greenland. These people survive by hunting seals, fish and whales at sea and caribou (reindeer) on land.

Such cold climates can also be found in mountainous areas of the world, such as the Himalayas, Andes and Rockies. Again, these areas have very low population densities as well.

Other areas of low population density are the tropical deserts – the Sahara, Arabian central Australia, Atacama, Kalahari/Namib and South West USA – where the very high temperatures for much of the year and lack of rainfall combine to produce a very harsh living environment.

Areas of ***high population density*** tend to be in, firstly, the temperate areas where there are no extremes of temperature and there is adequate rainfall to provide a reliable source of water for both people and farming. For example Western Europe, North Eastern USA, North East China and Japan. Certain tropical areas have high population density, such as Bangladesh, where there is year round high temperatures, reliable rainfall and fertile soils produce highly productive areas for farming, but not all – some are at present very inaccessible, such as the rainforests of Central Amazonia and Borneo.

99 per cent of the Egyptian population of 81 million is found on just 4 per cent of the country's land area – the rest being desert!

Water supply

Most people in the world get their water for drinking and for farming from two sources – rivers and lakes and from underground storages called aquifers. Both sources need to be supplied with enough precipitation which provides both rainfall and meltwater from snow and ice.

Water can flow long distances, both overland and underground, from the original source of the water and this can extend the area where people can live. For example, the Nile flowing across the desert in Egypt and the Colorado in South West USA. Where there is a lack of reliable water supply population densities are normally low.

Soils

The fertility of the soil is very important in determining how productive an area will be for crops. The most fertile soils are mineral rich and well drained. These tend to be found in river floodplains and deltas and in areas of volcanic rocks – which tend to weather down into very fertile soils. Where water is available, either naturally or by irrigation, areas of fertile soil can support high population densities – such as the island of Java in Indonesia.

Conversely, upland areas with thin, rocky, infertile soils may have low population densities as they may only be used for the extensive farming of sheep, for example in North Wales in the UK and the High Atlas mountains in Morocco.

Relief (Topography)

The terms relief and topography are used to describe the height and shape of the land. Population densities tend to be lowest where land is high and steep and highest where land is low and gently sloping or flat. The high land found in the world's major mountain ranges tends to have lower temperatures, more frosts and higher rainfall, which often falls as snow.

High land also tends to have steeper slopes which are more difficult to farm (though this can be overcome by terracing – as in the rice terraces of Indonesia and southern China). As a result, most of the world's population tends to be found in the lower areas of the world – around the coastlines and on river floodplains and deltas.

> Temperature drops at a rate of about 1°C for every 100 metres you go up in height.

Natural resources

The term *natural resource*, in its broadest sense, applies to any natural resource from water and soil to wind and minerals. However, in Population Geography terms, it usually refers to minerals such as coal, oil and metallic minerals such as iron ore, bauxite (the natural ore from which aluminium is obtained), gold, silver, tin, copper, etc.

The Industrial Revolution in the nineteenth century saw a massive movement (migration) of people to the major coalfields of Western Europe, especially the UK and Germany, and the US. The coal provided fuel for major industries, like the iron and steel industries, which provided thousands of new jobs and had a huge impact on population densities in places like South Wales in the UK and the Ruhr in Germany.

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The human factors

Economic factors

In today's world, economic factors are now extremely important in the location of industry which, in turn, provides jobs which affects where people live – i.e. population distribution.

The term *cumulative causation* is often used to describe this set of links – the fact that certain things will result (be caused) when a group of factors combine (accumulate) together.

One of the most important economic factors is transport. Where fast, efficient, reliable and cheap transport is available many industries will have an advantage as it will reduce their production costs and increase the area in which they can sell their products. A large modern port provides such a location, for example, Europort in the Netherlands, Singapore in South East Asia, Shanghai in China and New York in the US.

Motorways have a similar effect and attract industry. For example, the M4 corridor along the M4 motorway linking London and South Wales in the UK. These locations are often natural route centres on which other forms of transport, such as road, rail and air, converge. London and Paris are both good examples, as they are both at the centre of their country's road, rail and air networks.

Political factors

Political factors include government investment in the infrastructure of an area such as in roads, railways, airports and sea ports, and land reclamation.

National and regional governments, as well as the major *Trading Blocs*, such as the European Union, have very important role in deciding where industry, jobs, roads, railways, air and sea ports, housing, hospitals and schools are located and therefore, on the distribution of population. For example, the siting of the new olympic facilities in old run down industrial areas in London in 2012 and Sydney in 2004.

Social factors

Social factors include housing, health care, education and cultural opportunities.

Areas of the world where many of these factors combine together can either be densely populated or sparsely populated. For example, the Sahara desert, which stretches across several countries of North Africa, is very sparsely populated because its climate is too hot and dry for people and animals to survive comfortably.

Its soils are too dry, sandy or rocky. It has a poor water supply. Lastly, the countries it runs through are all poor LEDC's whose governments do not have the money to invest in improving their infrastructure in transport, housing, education and health care or industrial development.

At the other extreme, the world's most densely populated country, Bangladesh, has rich, fertile soil. It has a hot wet climate with easy access to water supplies. All of this means that it is ideal for growing crops and can support a very large population on a relatively small area of land.

Sometimes large urban areas may grow up in areas which are otherwise sparsely populated. For example:

- Around an oasis in a desert
- Near rivers where they flow through arid desert areas
- Mining settlements on coal or iron ore fields, or the production of oil as in Kuwait
- Growth of tourist destinations and resorts such as Dubai in the UAE and Sharm El Sheikh in Egypt
- Market towns where the products of a large rural area can be brought to sell
- Route centres and the junctions of major highways often in openings or gaps in mountain and hill ranges – gap towns
- Towns of strategic importance controlling access to a region
- New towns created by government policies
- Dry areas in otherwise waterlogged marshy land
- A sheltered, fertile valley in a highland area.

The following list is a selection of countries which show the great variations in population density that exist around the world.

Countries ranked by population density – in people/km²

Country and Population	Area in km²	Population per km²
1. Monaco – 33 000	1.95	16 923
2. Singapore – 5 077 000	699	7 148
8. Maldives – 329 198	298	1 327
11. Bangladesh – 143 000 000	143 998	964
35. Japan – 128 000 000	377 873	348
31. India – 1 225 000 000	3 287 263	395
45. Philippines – 92 226 000	300 076	307
50. United Kingdom – 62 000 000	243 600	255
52. Pakistan – 178 000 000	803 940	222
61. Kuwait – 3 566 000	17 818	200
80. China – 1 349 000 000	9 596 961	140
86. Indonesia – 238 000 000	1 904 569	121
European Union – 494 070 000	4 422 773	112

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Country and Population	Area in km²	Population per km²
120. Egypt – 81 850 000	1 001 449	81
169. South Africa – 51 000 000	1 221 037	41
179. USA – 313 000 000	9 629 091	32
223. Russia – 143 000 000	17 098 242	8
224. Canada – 33 740 000	9 984 670	3
230. Australia – 23 000 000	7 682 300	3
238. Greenland (Denmark) – 56 916	2 175 600	0.026
World Population – 7 000 000 000	148 940 000 km²	47

> It also includes all continental and island land areas, including Antarctica.

Earth's population is 7 billion and its area is 510 million km². The worldwide human population density is, therefore, 7 billion ÷ 510 million = 13.7 per km², or 46.7 per km² – if only the Earth's land area of 149 million km² is taken into account. This density rises when the population grows.

Considering that over half of the Earth's land mass consists of areas inhospitable to human inhabitation, such as deserts and high mountains, and that population tends to cluster around seaports and fresh water sources, this number by itself does not give an accurate measurement or picture of human population density.

> The most densely populated country is Monaco, with a population density of 16 923 people/km².

Macau, part of China, has the highest population density, with 541 000 people sharing an area of 29.2 km² – a population density of over 18 534 persons per km². Antarctica is 14 400 000 km² in area. With a population of roughly 1000, this results in a population density of 0.00007 people per km² (far below Greenland's density of 0.026). A peak summer population of 5000 results in an increase in density to about 0.00035!

The following list includes the top 10 countries by their population and the percentage of the total world population (to the nearest per cent).

1. China 1 349 000 000	20 per cent of total world population
2. India 1 225 460 000	17 per cent
3. USA 310 000 000	5 per cent
4. Indonesia 238 000 000	3 per cent
5. Brazil 196 000 000	3 per cent
6. Pakistan 178 000 000	2 per cent
7. Nigeria 158 000 000	2 per cent
8. Bangladesh 143 000 000	2 per cent
9. Russia 143 000 000	2 per cent
10. Japan 128 000 000	2 per cent
22. United Kingdom 62 000 000	1 per cent
136. Kuwait 3 566 000	0.042 per cent
214. Nauru 10 000	0.0001 per cent