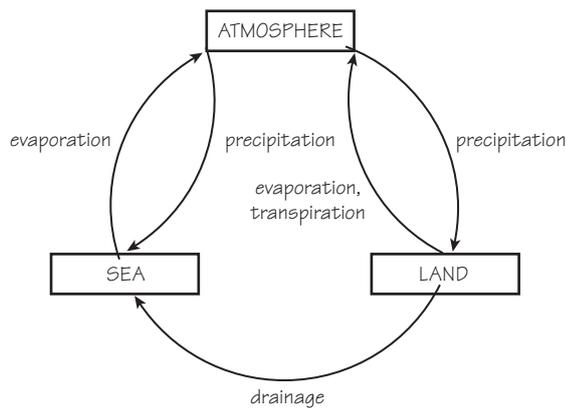


Chapter 1

1

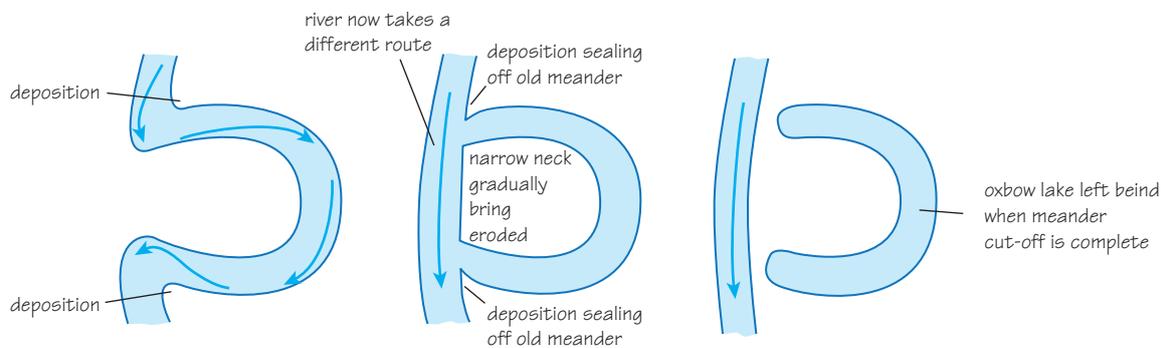


The hydrological cycle

- 2 a) A 'store' is a point in the hydrological cycle where water is held or stored.
A 'flow' is the movement of water between stores by a number of different processes.
- b) The three main stores of the hydrological cycle are:
- the sea
 - the atmosphere
 - the land – lakes, rivers, etc.
- c) Different types of flow are:
- evaporation
 - condensation
 - precipitation
 - overland flow
 - percolation and infiltration
 - throughflow
 - transpiration
 - groundwater flow.
- 3 a) Inputs are solar energy and precipitation. Outputs are river discharge and evaporation.
- b) A 'watershed' is the boundary between two neighbouring drainage basins.
A 'confluence' is the point where two or more rivers or streams meet.
- 4 The drainage system is affected by rock type and land use:
- Impervious rocks result in a relatively dense surface drainage network. With porous rocks, much of the drainage will be below ground, so the surface drainage network will be much less dense.
 - Human land uses interfere with the natural drainage network in a variety of ways including by piping streams underground, by filling in and straightening channels and by damming.
- 5 a) The term 'lag time' is the time it takes for rainfall to reach a river. More precisely, it is the time difference between peak rainfall and peak river discharge.
- b) Lag time is affected by each of these factors:
- slope – the steeper the slope, the shorter the lag time
 - temperature – the colder the temperature (if the precipitation is in the form of snow or the ground is frozen), the longer the lag time
 - precipitation – if precipitation is in the form of rain, the heavier and more intense it is, the shorter the lag time
 - vegetation – the thicker the vegetation cover, the longer the lag time.
- 6 When comparing Figures 1.6 and 1.7, one can see that the discharge of the Ganges is in general at least a thousand times greater than that of the Thames. With the Ganges (Fig 1.6), the highest flows occur in summer and autumn (between June and November), whilst the peak flow of the Thames (Fig 1.7) is more concentrated and occurs in winter between January and March.

- 7 a) Weathering is the breaking down of rocks *in situ* by the actions of weather, plants and animals.
Mass movement is the movement of weathered rock down slope under the influence of gravity.
- b) The four main ways that rivers transport load are:
- solution
 - suspension
 - saltation
 - traction.
- 8 a) When a river leaves an upland area, it changes in these ways:
- Its channel becomes wider, deeper and smoother.
 - Its speed and discharge continue to increase.
 - Its course becomes less straight i.e. it meanders more.
- b) Deposition is greater along the lowland section of a river because the river's energy becomes less. As a result, it is no longer able to transport the full load that it has been carrying.
- 9 a) The processes that are responsible for the formation of a V-shaped valley are:
- vertical down-cutting by the river by hydraulic action and abrasion
 - weathering and mass movement on the valley sides.
- b) Three other landforms produced by rivers in upland areas are:
- interlocking spurs which are caused by the river as it swings from side to side
 - waterfalls where outcrops of hard rock cross the valley
 - gorges where the widening of a valley is prevented by a capping of hard rock.

10

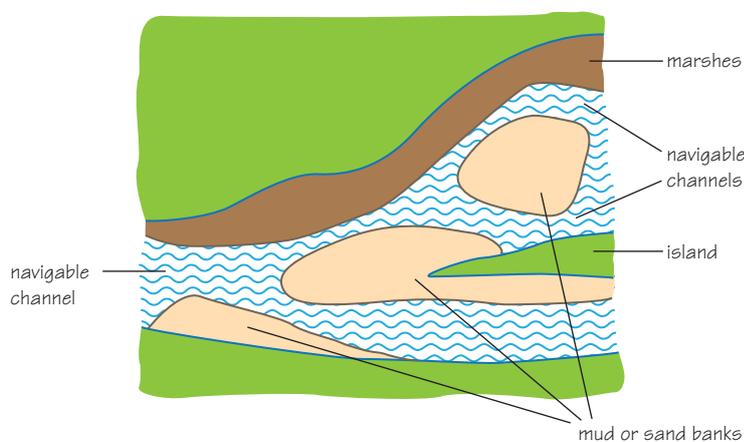


Formation of a meander and oxbow lake

- 11 Estuaries are formed where wide river channels enter the sea – there is much open water which is tidal.

Deltas are formed where river mouths become almost completely choked by deposits of alluvium. The river channel is split into many much smaller channels that carry the river water into the sea.

12 a)



Sketch map of part of the River Tay estuary

- b) On the sketch map, the navigable channels, sand and mud banks and marshy areas are labelled.
- c) An advantage of this estuary for shipping is that it has some deep channels but their precise course may change a great deal over time due to further deposition. A disadvantage is that there are already areas of shallow water caused by the deposition of sand and mud. Ships could run aground here.

13 a) The five main uses of fresh water are:

- agriculture
- industry
- domestic use
- electricity generation
- leisure and recreation.

b) The main sources of fresh water are:

- rivers
- lakes
- reservoirs
- aquifers.

14 The demand for water has increased over the last 100 years due to:

- global population growth
- rising standards of living – more water used for personal and domestic purposes
- industrialisation – water needed in many industrial processes and also in electricity generation
- more water used for irrigation and raising food production.

15 Water quality is important because much water is used by humans, for example as drinking water, in the form of irrigated food crops and in the processing of foods. Use of polluted or poor quality water is very likely to have a bad effect on human health.

16 a) Industry pollutes water through:

- discharge of industrial effluent into rivers and the sea. The effluent is often insufficiently treated
- working of minerals containing toxic elements
- industrial spillages (e.g. at oil refineries)
- returning to rivers water at high temperatures which have been used for cooling purposes.

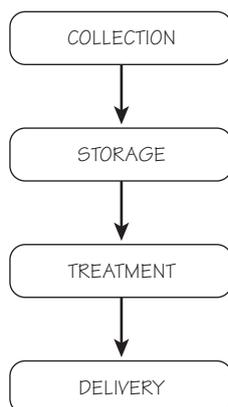
Agriculture pollutes water through:

- liquids from farm silage and farm animal slurry seeping into streams
- chemicals used in farming (fertilisers, pesticides and herbicides) contaminating groundwater
- clearance of forests to create more farmland.

17 Four other causes of river pollution are:

- discharge of untreated sewage into rivers
- use of rivers for washing and bathing
- clearance of land for urban and industrial use
- discharges from motor boats and shipping.

18



Stages in managing the supply of clean water

19 a) Benefits and costs of the Three Gorges Dam project in China

Benefits	Costs
More water for industrial use	Drowning of cities, towns and villages
More water for domestic use	Displacement of huge numbers of people from their homes
Generation of huge amounts of HEP	Use by river transport requires complex lock systems to get round the dam
Easier water transport within the reservoir	Rerouting of transport links that formerly ran along the banks of Yangtze
Better flood control	Loss of fertile farmland
Construction created a great deal of employment	Immense damage to the natural environment and its ecosystems
	Gradually silting of the reservoir

b) Reasons for choosing the benefits or costs could be:

- Benefits – there are immense and obvious economic benefits for China's expanding population; China's present development badly needs what the project is able to provide.
- Costs – immense human costs (suffering); long-term silting; environmental damage.

20 a) Physical factors that help cause flooding are:

- abnormal periods of intense or prolonged rainfall
- impermeable rocks
- steep slopes and rapid runoff
- high drainage density – short lag time
- sparse vegetation cover.

b) Deforestation and urbanisation can also cause flooding. Deforestation shortens the lag time – vegetation cover intercepts rainfall in such a way that it delays its entry into streams and rivers. Urban surfaces (roofs, roads and paved areas), together with drains mean a quick delivery of rainwater to rivers. The development of flood plains into urban areas without proper risk assessment can result in flooding of those areas.

21 a) Short-term consequences of flooding are:

- people and animals drowned
- loss of homes and personal belongings
- risk of contagious diseases associated with polluted water.

b) Long-term consequences of flooding are:

- relocation and rebuilding of settlements
- food shortages due to loss of crops
- increased debt to pay for repairs and rebuilding
- increased insurance premiums.

22 a) 'Flood adjustment' refers to actions that try to reduce the amount of future flood damage, for example by strengthening river embankments and reducing the human use of flood plains.

b) Hard engineering in the management of floods involves actions that try to 'control' nature and so reduce the flood risk. Examples are raising flood embankments, building sluice gates and creating spillways for floodwater.

Soft engineering involves actions that work with rather than against nature. Examples are preserving marshes and wetlands that can act as important stores of floodwater, ensuring that there is little or no building on flood plains, and setting up effective flood warning systems.

Chapter 2

- 1 a) The two zones of the coast are onshore and offshore.
- b) The four main marine processes are:
 - hydraulic action – this involves the force of waves hitting the bases of cliffs and compressing pockets of air into cracks and crevices. The result is that the rock becomes fractured and pieces break off
 - abrasion – results from waves picking up stones and sand and hurling them at the bases of cliffs and so wearing them away
 - corrosion – this is the dissolving of rocks by sea water
 - attrition – this involves a reduction in the size of material being transported by the sea. As a result of colliding, the material becomes not only smaller but also more rounded.

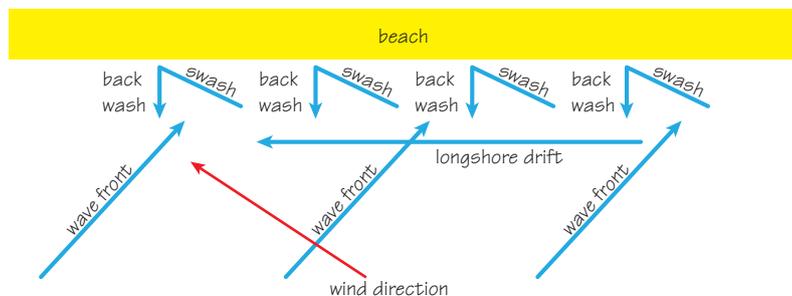
- 2 (Note that in the first printing of the student book, the diagrams in Figure 2.2 are incorrectly headed.)

Constructive waves and destructive waves produce distinct types of coastal features.

The backwash of destructive waves is stronger than the swash. Eroded material is dragged away from the cliff or beach and is then moved along the coast by longshore drift.

The swash of constructive waves is stronger than the backwash. The result is the deposition of eroded material on the beach or at the cliff foot.

- 3 a)

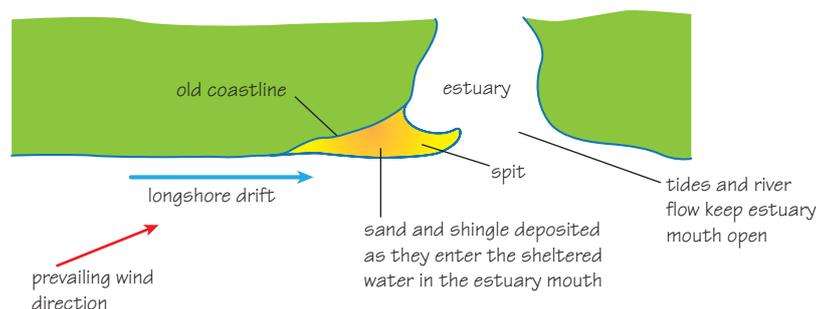


The wind direction is oblique to the shore, as are the wave fronts. This in turn causes the swash also to be oblique, but the backwash is directly back to the sea.

Longshore drift

- b) Longshore drift does three main things in terms of the development of coastal landforms. It picks up eroded material and so helps the formation of erosional landforms (headlands, caves, stacks, etc.); it transports material along the coast; and it deposits material and helps in the formation of beaches, spits and bars.
- 4 Looking at Figure 2.13, the Jurassic Coast is such a popular tourist location because:
 - its cliffs are scenic, unspoilt by tourist infrastructure such as hotels
 - it has good beaches which are mainly sandy and safe for swimming
 - it has interesting geology, especially fossils
 - it is readily accessible to a large urban population.
 - 5 a) A 'storm beach' is a ridge at the very top of a beach made up of material (sand and shingle) thrown up during storm conditions. A 'berm' is the term used for a series of small ridges that mark the position of 'normal' high tides below the storm beach. So the difference between the two is their size and location on the beach.

- b)

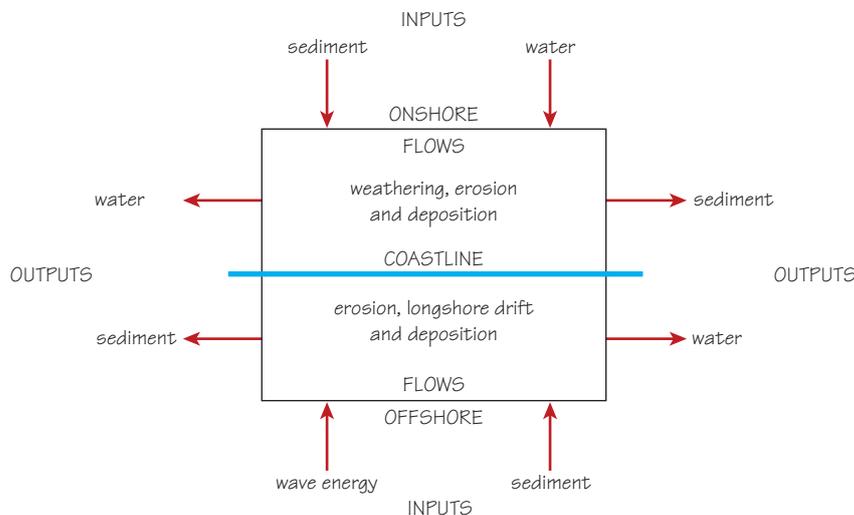


How spits are formed

- 6** The conditions necessary for the formation of sand dunes are by:
- a good supply of sand on a gently sloping beach
 - strong onshore winds to blow the dry sand inland and build it up into a series of ridges.
- 7** a) A coastline which has experienced a rise in sea level is called a submergent or drowned coast.
b) The main coastal features produced by changes in sea level are:
- rias and fjords (caused by a rise in sea level)
 - raised beaches and relict cliffs (caused by a fall in sea level).
- 8** Some of the ways in which people affect the character of the coast are by:
- protecting the coast from erosion – building sea walls, constructing groynes
 - building piers, jetties and docks
 - draining coastal marshes and putting them to agricultural, industrial or urban use
 - creating coastal promenades with hotels and boarding houses facing the sea.
- 9** a) The main features of the global distribution of coral reefs are:
- mainly confined within the tropics
 - large areas of coral reef in the Pacific Ocean are associated with islands
 - many reefs are found along the coasts of continents such as along west Africa and northern Australia
 - a few reefs occur in more inland locations such as the Red Sea and the gulfs of Aden and Oman.
- b) Physical factors controlling the growth of coral are:
- minimum water temperature of 18°C
 - sunlight
 - shallow water, less than 25 metres deep
 - salt water
 - well oxygenated water
 - clear water free of sediment.
- 10** a) The intertidal zone is the shore that is exposed to the air between the high- and low-tide marks.
b) Mangroves are a very tolerant ecosystem. They are able to survive in the two different environments of the intertidal zone, tolerating being regularly flooded by the sea as well as being frequently exposed to the air. Although essentially a marine ecosystem, mangroves are also tolerant of being flooded by freshwater. Not only are they able to survive changing water conditions, they also can cope with great heat and choking mud.
- 11** The conditions favouring the growth of salt marshes are:
- a sheltered coastal location, such as a bay or estuary
 - frequent flooding by the sea as happens in the intertidal zone
 - a network of creeks that reduce tidal energy and so encourage the deposition of mud and silt.
- 12** As one moves inland across a belt of sand dunes, the amount and type of vegetation cover increases from sparse grasses to heath and woods. It takes time for this plant succession to develop. Time is needed to add new sand ridges to the dunes to provide protection from possible flooding by the sea. This would kill much of the developing vegetation. Time is also needed for soils to develop over sandy areas through the accumulation of humus from dying vegetation.
- 13** a) The 'goods and services' of ecosystems are the useful things provided by particular ecosystems. The goods are material things and the services are opportunities.
b) Goods that coastal ecosystems provide include fish, shellfish, salt and seaweed. Services include natural harbours for shipping, sandy beaches for visitors to the beach and unusual wildlife.
- 14** It is important that mangroves are protected because they provide:
- protection to coastal settlements in areas that experience tsunamis
 - goods such as timber, fish and shellfish
 - opportunities for aquaculture.
- 15** The main threats to salt marshes are:
- reclamation to provide sites for factories and power stations
 - excavation for harbours or anchorages for port developments
 - pollution by settlements and industries.

- 16 a) Sand dunes are regarded as the least threatened of the coastal ecosystems because the possible uses to which they might be put are very limited. These uses are mainly to do with recreation and leisure (golf links, pony-trekking, etc.).
- b) The main threat to sand dunes is trampling – by people and livestock. Dunes in their early stages of development are very sensitive to disturbance by people. If the vegetation is damaged or dies, then blow-outs are likely. Another threat is the conversion into golf links with the associated development of club houses and hotels.

17 a)



The coast as a natural system

- b) In the UK, the term 'coastal cell' is used to classify a segment or stretch of coastline which is self-contained in terms of the movement of sand and shingle.
- 18 a) Conserving the coast is mainly about protecting it from developments that are likely to upset it in various ways. This involves understanding coastal processes and identifying activities or developments that threaten the coast's well being. The aim of conservation would be to neutralise those threats and keep the coast in as natural a state as possible.
- b) In the Southampton Water case study we see that the main conflict has been the reclamation of mudflats and marshes with their biodiversity and importance as feeding grounds for migrating and breeding birds. Mudflats and marshes have been reclaimed in order to provide sites for new docks, oil refineries and power stations.
- 19 Tourism threatens the coast in the following ways:
- coastal areas are developed to provide the necessary tourist infrastructure of hotels, bars and restaurants
 - the pollution of coastal waters
 - the concentration of tourists causing damage to sensitive habitats, such as sand dunes and coral reefs.
- 20 a) The 'coastal stakeholders' are the main users of the coast, such as local residents, tourists, fishermen, etc. They have a vested interest in its management and future.
- b) Examples of the conflicts that can exist between coastal stakeholders are:
- tourism versus farming and industry
 - fishermen versus yachtsmen and leisure boats
 - tourists versus local residents
 - port authorities versus wildlife lovers.
- 21 a) Hard coastal engineering involves building various types of sea defence, usually from rocks or concrete. Sea walls are built to protect the coast from erosion and flooding. Groynes are constructed to reduce longshore drift and so protect beaches and encourage deposition. Soft coastal engineering, unlike hard engineering, tries to work with nature rather than against it. It involves actions such as replenishing beaches that are being eroded, planting grasses on sand dunes to make them more stable, and regrading cliffs.
- 22 a) 'Managed retreat' is the recognition that it will be impossible to hold back the sea forever. Instead, plans are drawn up so that the sea is allowed gradually to encroach on coastal land. Managed retreat seeks to minimise the costs, risks and hazards associated with coastal change, particularly rising sea levels.

b) Managed retreat becomes the preferred coastal management option in areas where there is less urban development or high quality farmland. In these areas the coast has some value, for example money may have been invested in housing and various economic activities along that coast, but not enough to justify huge sums of money being spent on 'holding the line'. Basically, time is needed for an orderly withdrawal of people and land use.

23 The steps involved in making a coastal management plan are:

- Identifying what is happening along the chosen stretch of coast – what are the processes of change and how fast are they occurring?
- Investigating the present use and the value of buildings, economic activities and services.
- Making a risk assessment – to what extent are people and investment along the chosen stretch of coast threatened by the processes of coastal change?
- Determining the most appropriate of the three management options, bearing in mind the value of the coastal stretch and the degree to which it is threatened by coastal change.

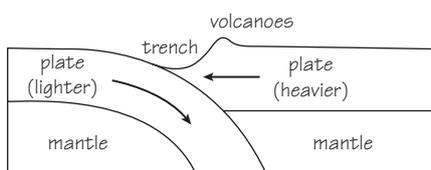
24 The challenge in dealing with global warming is coping with the resulting rise in sea level. The three main coastal management options are:

- Do nothing – let nature take its course, allowing the sea to flood onto the land or to break through sea walls.
- Hold the line – use hard engineering to hold back the sea.
- Managed retreat – let the sea 'win' but in carefully planned stages.

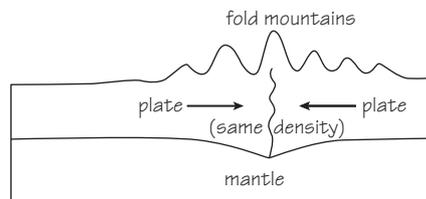
Chapter 3

- 1 a) A 'hazard' is an event which threatens the well being of people and their property by causing injury, death and destruction.
- b) The four main types of hazard are geological, climatic, biological and technological.
- c) An example of each type is:
- geological – earthquake
 - climatic – storm
 - biological – contagious disease
 - technological – nuclear explosion.
- 2 'Risk' is the chance of a hazard occurring at a particular place and the amount of damage it is likely to cause. Any location along a plate boundary runs the risk of experiencing an earthquake, but the risk may be higher in some places than in others. People can be more certain about the risk of a volcanic eruption in terms of location, but not in terms of time (i.e. when it is likely to happen).
- 'Adjustment' involves taking precautions to reduce a hazard risk and its possible damage. For example, adjusting to the risk of flooding might involve building embankments along a river and keeping settlement away from flood plains.

- 3 a) A 'tectonic plate' is a block of the Earth's crust which 'floats like a raft' on the underlying mantle.
- b)



Destructive plate margin



Collision plate margin

- c) Outcomes of a destructive plate margin – volcanic eruptions and earthquakes
 Outcomes of a collision plate margin – fold mountains and earthquakes
- 4 a) The areas where volcanoes occur most often are the west coasts of North and South America, Iceland, the African Rift Valley, and the east coast of Asia.
- b) The areas where earthquakes occur most often are along almost all the plate margins, but particularly around the shores of the Pacific Ocean, i.e. the west coast of North and South America, and the east coast of Asia.
- The conclusion is that not all plate boundaries have volcanoes, so the locations are not exactly the same. Earthquakes are more widespread.
- 5 a) The 'focus' of an earthquake is the underground centre of an earthquake. The shock waves travel outwards from it. The 'epicentre' of an earthquake is the point on the Earth's surface immediately above the focus. It is where an earthquake is likely to cause the worst damage.
- b) Earthquakes in coastal areas pose a particular threat, not only because they directly cause death and destruction (as earthquakes do in other areas), but also because of the tsunamis they cause. Tsunamis cause much death and destruction as people and buildings are swept away.
- 6 a) The hazards associated with volcanic eruptions are lava flows, choking ash and poisonous gases.
- b) Earthquakes pose a greater threat to humans than volcanoes because they are more widespread, and at a global level they occur much more frequently. Since volcanic eruptions are more predictable and there is usually a warning time before they erupt, they generally cause less damage than earthquakes. Many earthquakes also have a nasty after effect in the form of highly destructive tsunamis.

- 7** a) Alternative names of tropical storms are typhoons, hurricanes and tropical cyclones.
 b) The basic condition necessary for the development of a tropical storm is warm seawater, greater than 27°C, with unstable air above it. The sea heats the air. This creates an area of low pressure. This low pressure cell quickly intensifies and creates an upward spiral of strong winds. This uplift leads to very heavy rainfall.
- 8** Two weather features of a passing tropical storm are:
 1) The wind increases in strength reaching to over 100 kph. It then becomes completely calm in the eye of the storm, then abruptly rises to over 100 kph again and then gradually dies away.
 2) These same trends are observed with respect to rainfall. Rainfall intensity increases until the eye of the storm is overhead. The skies then clear only to see the return of very heavy rainfall which gradually declines towards the edge of the storm.
- 9** Tropical storms are most common in the Northern Hemisphere in September and October when sea temperatures are warmest.
- 10** a) The Saffir-Simpson scale is a classification of tropical storms. Five categories are recognised based on wind speeds. Each category is marked by a particular scale of damage. A category 5 storm, for example has wind speeds > 250 kph and causes wholesale damage to buildings as well as requiring the evacuation of all people.
 b) The three main types of damage caused by tropical storms are to:
- vegetation
 - buildings
 - people.
- 11** Tropical storms are tracked and their future paths predicted by:
- data provided by weather stations
 - images taken by weather satellites
 - radar.
- 12** The three main factors that affect the amount of damage and destruction caused by a particular hazard are:
- the scale and intensity of the hazard
 - the degree to which people are prepared for the hazard in question
 - the density of human settlement in the hazard area.
- 13** It would be reasonable to agree that the higher the population density, the greater the possible damage. However, the impact of a hazard in a high density area can be quite low if money has already been spent on various forms of adjustment such as education, warning systems, avoiding high risk areas and building to cope with the hazard. Furthermore, a HIC country is going to be better able to cope with a hazard. It will have the resources, organisation and technology to deal with the immediate emergency and any later reconstruction.
- 14** The damage caused by tropical storms is generally greater in LICs because most LICs do not have the resources and technology to cope with storms as well as HICs can, as regards the following:
- avoiding the settlement and use of high-risk areas
 - constructing buildings that are able to withstand hazards such as strong winds and earthquakes
 - having advanced warning systems and emergency shelters
 - educating people about preparing for a hazard and what to do during it
 - having emergency services that come into immediate operation following a hazard (not relying on emergency services from other countries).
- 15** Most will probably answer that it is more likely to be an earthquake, because:
- Earthquakes affect a much larger area of the world than tropical storms.
 - The approach of a tropical storm can be forecast thus allowing time for people to take shelter and precautions, perhaps even evacuating from the forecasted pathway.
 - An earthquake can strike without notice and can in general cause much more serious damage.
- It is the element of surprise that contributes most to making earthquakes scarier hazards.

16 Reasons why people continue to live in high-risk locations are:

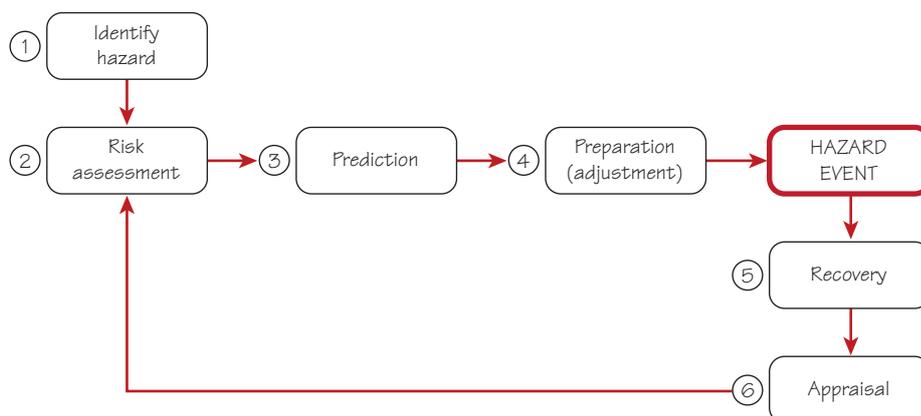
- no choice – mainly due to poverty
- acute population pressure
- ignorance of the scale of risk
- the belief that risk is in the hands of fate – optimism
- the view that the location has something special to offer and the risk of living there is worth taking
- the huge investment that has already been made in the high-risk area.

17 a) The possible benefits of volcanic eruptions are:

- minerals
- fertile soil
- geothermal energy
- tourism.

b) Another hazard that brings benefits is floods. Floods replenish flood plain soils and therefore help improve soil fertility and agricultural productivity.

18 a) Six steps in the management of a hazard



b) The six steps are:

- Identify the hazard.
- Risk assessment: determining the probability of a particular hazard happening, its likely scale and its damage.
- Prediction: setting up monitoring systems that might warn about an imminent hazard.
- Adjustment or Preparation: finding ways of reducing the possible death toll and the scale of damage to property. Educating people about the hazard that threatens and what do to in the case of the hazard occurring.
- Recovery: first emergency aid and then repairing the damage.
- Appraisal: an investigation after a particular hazard event. Was enough done by way of adjustment? How effective were the emergency services?

19 The Japanese prepare for earthquakes by:

- constructing houses, buildings and transport lines that are able to withstand the shock waves of all but the most powerful earthquakes
- educating people about what to do if an earthquake strikes
- providing quake-proof shelters
- having emergency services on standby.

20 The lessons learnt from the Kobe earthquake were:

- The construction of raised expressways was found to be at fault.
- The tracks of the bullet trains were not quake-proof. They broke in a number of places.
- The old urban areas are still vulnerable to earthquakes, particularly the traditional wooden buildings which are likely to catch fire when gas pipelines are broken.

21 The eruption of Mount Pinatubo was devastating because:

- First, there were the deadly pyroclastic flows.
- Next, the ash fell to a depth of 50 cm over a large area. The weight of this ash crushed many buildings and their occupants. Torrential rain washed even more ash out of the air. It was impossible to clear all the ash.
- Some years later, torrential rain turned the remaining ash into mudslides (known as lahars) which ran down the slopes demolishing all the houses that were in their way.

Not only did the Pinatubo cause three very damaging hazards but because the Philippines is a poor country, it could not afford to repair all the damage.

22 a) People try to predict earthquakes by:

- using seismographs that monitor earth movements
- monitoring for any changes in the height and tilt of land surfaces
- regularly checking water levels in wells.

People try to predict volcanic eruptions by:

- monitoring the escape of gases from the vents and sides of a volcano
- monitoring the occurrence of small earthquakes or tremors near the volcano
- looking for any swelling on the sides of the volcano.

b) These methods cannot be relied upon entirely, but they do help in some instances to raise alarm bells.

23 The sample answer is based on a comparison of volcanic eruptions and tropical storms:

- People know where the volcanic hazard is most likely to occur. This is more difficult with storms as they can occur almost anywhere within the Tropics
- Because volcanoes often lie dormant for long periods, there is less incentive to make special preparations. Tropical storms, however, occur every year and so people are more willing to invest in preparation (adjustment).
- People can prepare for volcanoes by erecting barriers to deflect lava flows away from settlements, providing a water supply to cool lava flows, and building houses with steeply sloping roofs so that ash does not accumulate on them.
- People can prepare for tropical storms by using reinforced concrete so that buildings are able to withstand high winds, building emergency shelters, and strengthening coastal and flood defences
- With both hazards, education can be an important part of preparation so that people are aware of what they should do during a hazard event and in the emergency period that follows.

24 a) 'Emergency aid' is help given by the United Nations, governments and NGOs to deal with the immediate aftermath of a hazard. It involves providing things such as bottled water, food, tents, blankets and medical help.

b) Organisations that provide emergency aid include the Red Cross, Oxfam and Christian Aid.

25 Organisations like the World Bank and the United Nations are important to long-term recovery from a hazard event because they can provide money (both grants and loans), technology, skilled labour and equipment to help rebuild that part of a country that has suffered a severe hazard.

Chapter 4

- 1 a) The primary sector involves the extraction of resources from the environment. The secondary sector is concerned with the processing of resources, as in manufacturing. So the difference between the two is one of resource extraction versus resource processing.
- b) The tertiary sector involves providing a wide range of services rather than dealing with natural resources. So the difference between the tertiary sector and the primary and secondary sectors is services versus resources (extraction and processing). The quaternary sector also provides services but of a higher order.
- 2 The three main ways to measure the relative importance of the economic sectors are by:
 - the percentage of total working population in each sector. However, the informal sector is not measured, but in LICs this can be significant. Also it does not take into account the value (financial and otherwise) of goods and services being provided by labour.
 - the percentage each sector contributes to GDP. However, this does not include earnings from overseas activities, such as investment. The informal sector is also not measured.
 - the percentage of GNI. This includes overseas earnings, but again does not measure the informal sector.

By a process of elimination, you might conclude that using the percentage of GNI is the best measure.

- 3 Research and development belong to the quaternary sector.
- 4 a) The 'development pathway' is the sequence of changes that a country undergoes as it becomes more developed, that is, as the economy grows and the people enjoy a higher standard of living and better quality of life.
- b) The relative importance of the economic sectors changes with development. In the beginning (pre-industrial stage), the primary sector dominates. However, its importance declines as, first, the secondary sector grows (industrial stage) and, later, as the tertiary sector becomes dominant. In the post-industrial stage, the secondary sector, declines in importance and the quaternary sector emerges.
- 5 Comparing the pie charts of the three countries shown in Figure 4.4, one can see that in Ethiopia, the primary and tertiary sectors contribute more or less equally to GDP at about 45% each, while the secondary sector is insignificant. In contrast, it is the primary sector that is insignificant in China; the secondary sector accounts for roughly half of all GDP. In the UK, the economy is dominated by the tertiary sector (roughly 75% of GDP), the secondary sector contributes only half of what it does in China and the primary sector has almost disappeared.

Remember that these pie charts relate to GDP and not employment. A sector can make a small contribution to GDP and yet still employ many people, for example the primary sector of China. Also remember that these pie charts reflect the monetary value of what is being produced in each sector. Manufactured goods are generally more highly priced than foods, and services are more costly than manufactured goods.

- 6 Reasons why the tertiary sector is relatively insignificant in LICs are:
 - The national economy is unable to afford to provide basic social services such as schools and medical centres so there are few jobs in these services.
 - People earn very little and therefore have little or no disposable income to spend on services.
 - Many people are involved in subsistence farming and produce their own food rather than buy it in shops so there are fewer people working in the retail services sector.
- 7 The distinctive features of a post-industrial country are:
 - industrial relics such as abandoned factories and brownfield sites
 - involvement in high-tech industries
 - high dependence on the tertiary and quaternary sectors.
- 8 a) 'Informal employment' involves many jobs that are commonly found in LIC towns and cities. They are part of the 'black' economy and therefore they are not officially recognised. In fact, many are illegal. Because of a shortage of full-time jobs, people are forced to work for themselves in order to support their families. They do so in a wide variety of activities, mainly on the streets, from shoe-

cleaning to selling food, from scavenging to begging. Many children are involved and as a result are exposed to hazards such as street crime, violence, abuse and unhealthy working conditions.

b) 'Informal employment' is important in many LICs because of the general shortage of full-time, properly paid work in the mushrooming towns and cities. More people are migrating to urban areas than jobs are being created. The prevailing poverty forces people to try to gain or supplement their income by working in the informal sector. Informal employment plays an important role in the day-to-day running of LIC cities.

9 The disadvantages of informal employment are:

- It is easy for workers, especially children, to be exploited and abused.
- Earnings are pitifully small.
- Much of the work is dangerous or hazardous and because most of the jobs are illegal, there are no health and safety regulations to protect the workers.

10 The reasons for the expansion of the tertiary sector in HICs are:

- Economic development means that a country is able to afford more and better services, such as schools, medical centres, hospitals and libraries. More services mean more jobs in the tertiary sector.
- Economic development also means that people have more money to spend in the shops on basic items such as food and clothing. Again, the results are more jobs and tertiary sector growth.
- As workers' wages and salaries rise, they have more disposable income to spend on luxuries such as leisure (entertainment, eating out, etc.) and tourism (holidays, etc.). Again, the spending of increased amounts of disposable income means more jobs in service industries.
- Advances, especially in technology, create new services and therefore new jobs, both of which contribute to the growth of the tertiary sector.

11 Tertiary services are concentrated in the centres of towns and cities because they need to be accessible to as many customers as possible. Those customers come not only from all parts of the urban area, but also from surrounding rural areas. The centres of towns and cities are usually accessible transport hubs because roads and public transport services such as railways and bus routes converge on them.

12 a) Four developments increasingly found in the urban fringes of HIC cities are:

- superstores and retail parks
- industrial estates
- business parks
- science parks.

b) These developments are attracted to the urban fringe by:

- good accessibility, especially by road, and plenty of car parking space
- relatively cheap land and room for expansion
- labour which is available from nearby suburbs
- more attractive surroundings than in urban centres.

13 a) High-tech industries are economic activities that rely on advanced scientific research and produce new, innovative and technologically-advanced products, such as microchips, new materials and new medical drugs.

b) The kinds of activity that are involved in biotechnology are:

- developing new medical drugs and treatments
- improving the quality and productivity of crops and livestock (GM)
- promoting the industrial use of crops, for example biofuels
- developing biological weapons.

14 a) The 'global shift in manufacturing' is the relocation of traditional manufacturing (steel, chemicals, ships, etc.) away from HICs where they first developed to MICs and LICs. Despite this trend, over half of all manufacturing in the world occurs in just three countries – the USA, China and Japan.

b) The UK and Germany are examples of countries that have lost manufacturing. China and India are countries that have become new centres of manufacturing.

15 a) The global shift in manufacturing has occurred due to change in the relative importance of location factors. Due to advances in transport, factories are no longer tied to sources of raw

materials and energy, or the markets they sell to. So industries have become more flexible in terms of their location.

The location of manufacturing is today more influenced by the availability of cheap labour and cheap land, and attracted to those countries where there are less tight controls on industry as regards worker safety and environmental pollution.

This change in the relative importance of location factors favours the MICs and LICs, rather than the HICs. However, it would be wrong to think that HICs are no longer involved in manufacturing. It is the type of manufacturing that has changed in the HICs – the old traditional industries there have been replaced by new branches of more high-tech manufacturing.

- b) The factors that have made the shift possible are:
- advances in transport – cheap movement of raw materials and goods over long distances by large freight carriers (ships, railway trains). Also the speedy movement of technicians
 - advances in communications. It is easy for the head office of a company to keep closely in touch with factories scattered around the world
 - the growth of TNCs which are able to operate on a global scale, i.e. have a presence in many countries.
- 16** a) The emergent economies listed in Table 4.2 are:
- China
 - Russia
 - Brazil.
- b) Two emergent economies that one could expect to appear on the list, if it was extended to the top 15 manufacturing nations, are India and Mexico.
- 17** A list of the attractions of the M4 corridor as a location for high-tech industries are:
- good transport and accessibility
 - skilled, well educated labour
 - presence of universities for research
 - pleasant living and working environment
 - government incentives.
- 18** The difference between primary and secondary energy is that primary energy is provided by fuels in their raw state. They do not require processing to be used. Examples are coal and wood which are burnt to provide heat. Secondary energy comes from the processing of primary energy. Examples are burning coal and natural gas or harnessing the flow of water to generate electricity.
- The difference between renewable and non-renewable energy is that renewable energy comes from sources that can be used again and again. Examples are hydroelectricity from running water and the tides, wind power and solar energy. Non-renewable energy comes from sources that, once used, cannot be replaced. Examples are fossil fuels such as coal and oil.
- 19** a) The 'energy gap' has two slightly different meanings. The first is the difference between a country's rising demand for energy and its ability to meet that demand from its own resources. The second meaning is the gap in energy supply resulting from the phasing out of non-renewable sources and their replacement by renewable sources of energy.
- b) Countries which have an energy gap are those countries which have high levels of energy consumption and relatively low levels of energy production. Examples are the UK, Italy and Spain in Europe; Mexico and Ecuador in Latin America; and Japan in Asia.
- 20** The arguments in favour of using energy more efficiently are that it reduces the amount of energy needed. This is likely to reduce the use of non-renewable sources of energy and lower carbon emissions. The result will be less atmospheric pollution and possibly less global warming. Using energy more efficiently also means that there is a greater chance of energy needs being met by the use of renewable sources.
- 21** Ways I could reduce my consumption of energy include:
- hibernating or turning off PCs when not in use
 - switching off lights when I am the last person to leave a room
 - not overcharging mobiles
 - walking rather than using the car
 - using energy-efficient light bulbs.

- 22** The benefits of using coal as a source of energy are that there are large proven reserves and it is relatively cheap. The costs are:
- it causes atmospheric pollution
 - its carbon emissions contribute to climate change
 - the mining and processing the coal have adverse impacts on the environment.
- 23** Nuclear power is not renewable because it relies on a non-renewable mineral resource – uranium. In fact, the known global reserves of uranium are very limited. The uranium has to be converted into a nuclear fuel before it is used to raise the steam that generates electricity. However, used fuel can be reprocessed and therefore recycled. Because of this recycling nuclear energy is sometimes classified as a renewable source.
- 24** By the time that the world runs out of oil, people should have found alternative sources of energy. Ideally, those alternative sources should be of a renewable kind. Examples are wind, water, solar and tidal power, all of which are used to generate electricity. People might also discover an alternative energy form to electricity.
- 25** In support of the statement that most renewable sources of energy are clean and environmentally friendly, you might:
- identify renewable sources (wind, water, solar, tidal)
 - explain that they do not pollute the environment other than visually disfigure the landscape
 - admit that the use of water (i.e. rivers) can have an adverse impact on river regimes, and that wind farms are believed to have an adverse impact on birds.
- If you disagree with the statement:
- identify renewable sources (as above)
 - explain that the sources may be clean, but they do have adverse environmental impacts, particularly disfigurement of the natural environment. Also mention the points made above about the use of rivers and wind farms
 - conclude that the sources are only 'clean' with respect to land, water and air, but not with respect to scenery and wildlife.

Chapter 5

- 1 a) The names of the nine largest biomes are:
 - Tropical forest
 - Savanna
 - Desert
 - Mediterranean
 - Temperate grassland
 - Deciduous forest
 - Coniferous forest
 - Tundra
 - Mountain.
- b) The two climatic factors that most influence the global distribution of biomes are temperatures and the amount of precipitation.
- 2 The main characteristics of the tropical rainforest are:
 - fast growing vegetation
 - tall evergreen trees with buttress roots to give them support in thin soil
 - many different tree species
 - dense canopy of leaves shading the ground so that there is little undergrowth as little sunlight reaches the ground
 - parasitic plants living on the trees and feeding from them.
- 3 a) 'Biomes' are global ecosystems and accord with the main climatic regions of the world. An ecosystem is a basic working unit of nature in which living plants and animals interact with the physical environment (air, water, sunlight, rock and soil). 'Ecosystems' exist at a range of scales within the biomes, from a small pond to a cleared area within the tropical rainforest. Both biomes and ecosystems involve inputs and outputs, as well as flows of energy.
- b) The ecosystem is shown as a pyramid because of the food chain that operates within every ecosystem. Primary producers (plants) are eaten by primary consumers (herbivores). The herbivores become the food of secondary consumers (carnivores). At each of those stages or levels in the food chain, the number of species becomes much less. So if each level is illustrated by a horizontal bar proportional in length to the number of species, the ecosystem may be seen as having a pyramidal structure.
- 4 The 'goods' of the savanna include grazing for livestock, fuelwood from the scattered trees and shrubs, and food such cereals and berries. The 'services' are maintenance of biodiversity, open recreational space, and arable land.
- 5 The features of the temperate grassland biome are:
 - distribution – poleward of the tropics in large areas in the heart of North America, along the Atlantic coast of South America, central Eurasia, China, southern Australia and New Zealand
 - soils – chernozems which are dark in colour and highly fertile
 - vegetation – dominated by short grasses.
- 6 a) Farming in the Midwest of the USA experienced a crisis in the early 20th century because the once fertile land was abused by being over-worked. This, plus the virtual monoculture of cereals and the failure to properly fertilise the soils, set in motion a sequence of declining yields. The final straw was provided by the run of drought years in the 1930s. Because the soil was by then in a poor condition and the land left bare for part of the year, severe soil erosion set in.
- b) To restore agricultural productivity, the soil was improved by introducing crop rotation to replace the previous monoculture. Tree belts were planted to protect the soil from wind erosion. Straw and other crop litter was retained after the harvest and left on the soil to protect it from erosion. Terracing and contour ploughing was done to prevent soil being washed downslope during periods of heavy rainfall. There was more irrigation to stop the soil drying out.

- 7** The characteristics that generally distinguish a rural environment from an urban environment are:
- lower population densities
 - smaller individual settlements
 - most jobs are in the primary sector, especially farming
 - prevalence of greenery rather than concrete areas and development
 - it is less well served by transport.

There are often conservation efforts to protect the biodiversity, scenic beauty and recreational value of rural environments.

- 8** It has become necessary to protect and manage some rural environments to:
- protect against the spread of urban areas, especially onto more valuable agricultural land or land of high scenic quality
 - provide recreational space for urban populations
 - conserve biodiversity
 - ensure the survival of wilderness areas.
- 9** Farming is an open system with inputs (such as land, soil, climate, seeds and livestock), internal flows (the actual growing of crops and rearing of livestock on the farm) and outputs (such as food, profits and waste). It is also an open system in that it is influenced by market conditions (such as the level of demand and commodity prices) and governments (offering subsidies and grants to use farmland in a certain way).
- 10** a) Some governments try to control farming to ensure that:
- the country produces what is needed, either for home consumption or for export to other countries
 - there is neither under- nor over-production.
- b) Examples of government intervention are:
- giving subsidies and grants to encourage farmers to grow certain products, as in the EU
 - taking land out of production to reduce surpluses, such as the set-aside scheme in the EU
 - constructing roads to encourage the opening up of new farmland, as in the rainforest of Brazil.
- 11** The differences are:
- With subsistence farming, most of the food produced is consumed by the producers. With commercial farming, the food that is produced is mainly sold to consumers via markets and shops.
 - Arable farming is focused on the growth of crops while pastoral farming on the rearing of livestock.
 - Intensive farming involves using a relatively small amount of land to produce a high yield or high value crop, for example in market gardening and horticulture. Extensive farming uses large areas of land to produce a product with a lower yield and price, for example animal herding or wheat growing.
- 12** Six ways to increase food production are:
- extending the farmed area – cultivate more land to produce more food
 - irrigation – this ensures a supply of water especially during the dry periods in the year. This allows for year-round growth of crops, provided temperatures remain sufficiently high
 - crop rotation – ensures that vital minerals are returned to the soil and the soil is not overused
 - applying fertilisers to enrich the soil
 - applying herbicides and pesticides to eliminate weeds and diseases
 - genetic modification of crops and livestock to increase their individual productivity and give them greater protection from disease.
- 13** Irrigation has a downside in that too much irrigation can lead to the ground becoming waterlogged. This is not good for plant life, especially crops. Also, the evaporation of irrigation water during hot, dry seasons causes salts in the soil to form a pan or hard layer within the upper parts of the soil. This salt pan is poisonous to plants and also interferes with soil drainage. Also, some irrigation water is being pumped at a rate that cannot be sustained by the underground aquifers. Furthermore, irrigation reservoirs use up areas that could be good agricultural land.
- 14** There is so much controversy over the growing of GM crops largely because of uncertainty on two counts: 1) their impact on ecosystems, and 2) possible adverse effects on human health. Also, seeds are expensive and therefore out of the reach of LIC farmers.

- 15** One of the consequences of an overproduction of food in HICs are low prices resulting in farmers not being able to make a profit and people eating too much. Eating too much is resulting in an obesity epidemic with many health risks. There is also much wastage of food.
- 16** The UK imports 40% of its food because:
- certain types of food are being produced more cheaply elsewhere. UK farmers cannot compete
 - some types of food need warmer weather to grow, such as bananas and pineapples
 - there is a year-round demand for seasonal fruits and vegetables because people expect the same products to be on supermarket shelves throughout the year.
- 17** The main causes of food shortages in LICs are:
- Fast rates of population growth means that there are many more people to feed.
 - There is a large volume of rural-urban migration so more people are relying on the food produced by others; there are fewer people producing food.
 - International agri-businesses are taking over farmland and using it to grow crops for export or for biofuels.
- 18** The sequence involved in the 'cycle of hunger' is: People suffering from hunger are malnourished. This means that they lack energy and are vulnerable to disease. This in turn means that they are unable to work, particularly on a full-time basis. This in turn means either that they are not able to grow all the food they need or are unable to buy food. The result is that there is less to eat and so people become more hungry and malnourished.
- 19** The symptoms of rural poverty in LICs are:
- inadequate housing with limited access to clean water and proper sanitation
 - malnutrition
 - poor schools and healthcare
 - relatively few working people – many have moved to towns and cities; also many are dying from HIV-AIDS.
- 20** The costs and benefits of the shift in LICs from subsistence to commercial farming are:

Costs	Benefits
Basic food prices rise. Wages taken up buying food	Regular work and steady wages
Workers at the mercy of agri-businesses	A regular supply of certain types of foods
Subsistence farmers join the rural-urban migration	The possibility of exporting and earning foreign currency
High carbon footprint of producing crops for sale overseas	

- 21** The case for preserving rural space in the urban fringe is:
- its use for recreational purposes
 - the attraction of having green space close to suburban development, i.e. amenity value
 - it helps create a gradual transition from rural to urban space.
- 22** The attractions of the commuter belt are:
- cheaper housing
 - slower pace of life with less stress and pressure
 - better residential environment
 - access to the countryside
 - the possibility of a relatively better quality of life than in the denser urban areas
- but these attractions are offset by the costs of commuting.
- 23** Farms in the accessible countryside are diversifying by:
- going organic
 - selling directly to customers via farm shops and farmers markets
 - providing overnight accommodation and becoming involved in tourism
 - using farmland for recreation and leisure
 - becoming involved in craft industries.
- 24** The main changes taking place in the remote countryside are:
- continuing out-migration of younger people resulting in ageing populations
 - depopulation
 - decline in commercial and social services
 - greater involvement in tourism and leisure activities
 - use of broadband to overcome remoteness thus allowing telecottageing and the influx of some newcomers
 - its increasing popularity as a retirement area.

Chapter 6

- 1 a) Urbanisation is the process whereby an increasing number of people live in towns and cities rather than in rural areas.
b) Three causes of urbanisation are:
 - economic development creating job opportunities outside farming
 - high rates of natural increase in towns and cities
 - rural-urban migration.
- 2 Cities in LICs are growing faster than those in HICs because of:
 - higher rates of natural increase
 - greater volumes of rural-urban migration
 - HICs already being highly urbanised, are further along the urbanisation pathway.
- 3 The distinguishing features of each of the following urbanisation processes are:
 - suburbanisation – the creation of large areas of low density housing
 - decentralisation – the movement of people, jobs and services away from the centres of towns and cities
 - counterurbanisation – the movement of people and jobs away from large cities and into towns and even rural areas
 - urban regeneration – improving the image and fabric of rundown urban areas by finding new uses for old buildings, and modernising them.
- 4 a) A 'dormitory settlement' is a town or village where most of the working population commute to work elsewhere.
b) Conurbations are formed either by the growing together of once separate towns and cities into a single large urban area, or by the outward growth of one large city engulfing former villages and small towns.
- 5 a) A 'megacity' is a city with a population of over 10 million.
b) The number and distribution of megacities is increasing in number. In the 40 years since 1970, the number of megacities rose from 4 to 24. Forty years ago they were all located in HICs. Today, the majority are located in MICs and LICs.
- 6 a) World cities are the leading cities of the world. They are also referred to as 'global cities'. They are places of great prestige and have a large amount of economic and political power. They are the major hubs in the global economy, mainly because they are all important centres of international finance.
b) Three world cities are London, Tokyo and New York. These are the most important world cities.
- 7 The main causes of rapid urbanisation in LICs are rapid economic development, high rates of natural increase in towns and cities, and large volumes of rural-urban migration.
- 8 Four problems, other than the growth of shanty towns, created by rapid urbanisation include:
 - environmental pollution, especially of air and water, by industry, transport and housing
 - shortage of employment – underemployment leads to the growth of an informal sector
 - traffic congestion – roads are unable to cope with the greatly swollen volume of traffic
 - shortage of social services, such as schools and healthcare.
- 9 a) Figure 6.15 shows the pattern of urban land values with the highest land values occurring in the centre and values generally decreasing towards the urban fringe. Relatively high land values occur along radial and ring roads. Small land value peaks occur at the intersection of ring and radial roads.
b) Other features of the city that change with increasing distance from the centre are that land use changes from mainly commercial to residential. Another change is the age of buildings with the newest buildings occurring at the edge of the built-up area.
- 10 a) The four zones of a city are:
 - the core or CBD
 - the inner-city ring
 - the suburban ring
 - the urban fringe.

- b) Similar activities tend to come together at particular locations within the city because:
- their location is controlled by the same location factors, such as access to clients and good transport
 - they can afford the same general level of land values
 - they often benefit from clustering in the same part of the city, for example shops or offices in the CBD.
- 11** Typical features of a CBD are:
- high densities of people and traffic, especially during the day
 - vertical development in the form of office blocks
 - land use is predominantly non-residential (commercial)
 - it is often the oldest part of the town or city.
- 12** a) The features that distinguish different groups of people within the city are:
- social class
 - wage or salary levels (affluence)
 - ethnicity
 - type of residential occupancy (owner-occupiers versus tenants).
- b) These different groups live in different parts of the city because they vary in terms of what they can afford to pay for housing, i.e. they will live in that part of the city where the costs of housing are affordable for them.
- 13** a) A 'ghetto' is an area in which a minority ethnic group is concentrated. In these areas, the ethnic group accounts for the majority of the population.
- b) The reasons given for the existence of ghettos are twofold:
- One reason suggests that members of a minority group choose to live close together because they feel more secure and more at ease. Living in a ghetto helps them to preserve their culture and traditions. It also gives them more political influence.
 - The second reason suggests that ghettos develop because of discrimination by the majority in a whole range of different matters such as housing, employment and education. Members of an ethnic minority are forced to live in areas of poor, cheap housing, usually in particular areas.
- 14** a) 'Shanty towns' are areas of slum housing built of salvaged materials and located either on the urban fringe or within the city on hazardous ground previously avoided for urban residential development.
- b) Shanty towns develop mainly as a result of large volumes of rural-urban migration. The supply of proper housing is unable to meet the demand, so people are forced to make their own dwellings wherever there is any vacant (unused) space.
- 15** Some of the ways of improving living conditions in shanty towns could be by:
- providing basic services such as piped water and proper sewage disposal
 - recognising that residents have a right to live on the land that they occupy
 - setting up self-help schemes in which residents are encouraged to build their homes of proper materials to make them safer and more permanent
 - providing social services such as schools and healthcare.
- 16** The push factors responsible for people moving to the urban fringe are poor quality housing and residential environments, the closure of factories and a decline in services in the centre. The pull factors to the fringe include better housing and residential environments, cheaper housing, nearness to work, and access to the countryside and recreational areas.
- 17** Retailing is moving out of CBDs to urban fringe retailing parks because of better accessibility, especially by car and with car parking space; the parks are able to attract customers from more than one town or city; and there is more space and cheaper land for the large-scale retailing units (superstores).
- 18** a) Three other types of business development found on the edges of HIC cities include industrial estates, business parks and science parks.
- b) For these businesses, the attractions of the urban fringe are much the same as for retailers, especially as regards access, space and the wider recruitment of workers as well as clients. A more pleasant working environment is also important to business and science parks.

- 19** a) The differences between a brownfield and a greenfield site is one of use. A 'brownfield site' is usually within an urban area that has been previously used by some non-agricultural activity. It currently lies idle as it waits for some new use to be found for it. A 'greenfield site' is usually located outside urban areas, where its use has been mainly agricultural.
- b) The arguments for using brownfield sites include:
- reducing the loss of countryside and land that could be used for food production or recreation
 - helping to revive old and abandoned urban areas
 - the services needed by development are already in place
 - being located closer to the jobs and services of the urban centre reduces transport and commuting costs.
- 20** a) Deprivation occurs when a person's well-being falls below a level which is widely thought to be the absolute minimum. Housing, employment, health and education are the key aspects of life in which deprivation can be most severe.
- b) The 'cycle of poverty' is based on the idea that poverty and deprivation are passed on from one generation of a family to the next. The children of poor parents may receive little parental support and may be forced to attend inadequate schools. As a result, they leave school at the earliest possible opportunity with few qualifications. This means that they have difficulty in finding work other than in that which pays minimum wages. Their children, in turn, are born into the same deprived circumstances and become trapped in the same cycle.
- 21** Using Figure 6.27, one can identify that those areas of Birmingham which are the least deprived occur in the suburbs to the north and east of the city centre. There is also a noticeable belt to the southwest of the centre.
- 22** a) The reasons for the decline of the inner city in the 20th century were:
- buildings became old and obsolete, and costly to maintain
 - people preferred to move out to live in new suburbs due to better transport links and the attraction of a better environment
 - deindustrialisation resulting in factories closing down and a loss of jobs.
- b) The reasons for the revival of the inner city in the 21st century are:
- people and businesses realising the advantages of living close to the jobs, services and amenities of the CBD rather than a long way from them in the suburbs and beyond
 - the increasing costs of transport
 - changing public tastes and perceptions of the 'cool' lifestyle and trendy residential locations with people appreciating the 'character' of the old buildings once more
 - effective rebranding.
- 23** a) 'Gentrification' is the movement of better-off people back into rundown, inner-city areas, resulting in the improvement of the housing, built environment and image. 'Gated communities' are areas where expensive housing is protected by a perimeter wall or fence with controlled entrances for residents and their visitors.
- b) In gentrification and gated communities, it is the wealthier people who have benefited most. With gentrification, they are able to enjoy living close to their place of work and also enjoy the CBD with all its amenities. With gated communities, wealthy residents are able to enjoy very good housing that is secure and relatively free from crime and vandalism.

Chapter 7

- 1 The threats most likely to disturb fragile environments are:
 - population pressure
 - unsustainable use of resources
 - ignorance of the environment and the workings of ecosystems.
- 2 a) The 'ecological footprint' is the impact people have on the environment, mainly through their consumption of resources.
b) 'Sustainability' is the long-term maintenance of the well-being of people and the natural world through the responsible use of natural resources.
- 3 Three main types of soil erosion:
 - sheet erosion – moderate rainfall on bare soil on gently sloping ground
 - gully erosion – caused by intense rainfall falling on poorly vegetated slopes
 - wind erosion – strong winds blowing over bare soil.
- 4 The term that best describes soil erosion is 'the washing away or blowing away of soil'. The term that best describes desertification is 'little vegetation now covering an area'.
- 5 The human activities that cause soil erosion are:
 - removing vegetation by cutting down trees and bushes either for fuelwood or to create more farmland
 - overgrazing livestock – this also removes or kills vegetation
 - monoculture – growing the same crop over and over again weakens the soil and makes it more vulnerable to erosion.
- 6 a) 'Desertification' is the process whereby once productive land is changed into a desert-like landscape. The process has both physical and human causes.
b) The main physical causes are:
 - climate change – areas becoming drier and rainfall less reliable; vegetation dies back
 - soil erosion – this results in the vegetation cover becoming less
 - short periods of intense rainfall – these cause soil erosion and a further loss of vegetation.
- 7 People have contributed to the desertification of the Sahel by:
 - overgrazing by large herds of cattle and goats
 - population growth – more vegetation cleared to provide fuel and building materials
 - clearance of thin vegetation cover in order to grow crops
 - failure to replenish the soil – little humus in the soil means that it dries out quickly and is likely to be eroded.
- 8 Some of the worst consequences of soil erosion are that ecosystems are badly damaged with a loss of biodiversity, and less food being produced. This can lead to widespread malnutrition and in extreme cases, famine and starvation. Large-scale migration is triggered as people search for food. The migrations can lead to civil and tribal wars, and wars between countries. All this often results in urgent calls for international intervention and food aid.
- 9 Methods used to combat or prevent soil erosion are:
 - maintaining a vegetation cover throughout the year, i.e. protecting the soil from rain and wind
 - planting wind breaks (such as trees and hedges) around cultivated areas. These protect or shelter the soil
 - regular mulching of the soil, i.e. feeding it with organic matter
 - contour ploughing
 - strip cropping
 - terracing slopes
 - organic farming.
- 10 a) The 'goods' of a tropical rainforest are timber, medicinal drugs, minerals and fuelwood. The 'services' are land for shifting subsistence farming, and rivers and space for the construction of hydroelectric power reservoirs.
b) Deforestation is the deliberate clearing of forested land for a range of reasons that often lead to serious environmental problems such as soil erosion and a loss of biodiversity.

- c) It is the exploitation of these goods and services that are the main causes of deforestation, both directly and indirectly. Indirectly, for example through clearing forests to make way for the roads and other transport infrastructure needed to exploit these goods and services.
- 11** The creation of vast areas of farmland, particularly to create pasture for livestock, is the main cause of the large-scale deforestation of the tropical rainforest biome. Cleared land is also being used to grow biofuels. Another cause of deforestation is population pressure and the building of new settlements.
- 12** You might argue that the land use which most threatens the future of the tropical rainforest is the clearance of the forest for livestock rearing and the growing of biofuel crops. The impact is huge because of the scale of the clearance and the fact that the forest is completely cleared. At least where large-scale timber extraction is taking place, there is a chance of some recovery as usually not all the trees are felled. The forest may survive in the form of a secondary forest.
- 13** The two main concerns about the deforestation of the tropical rainforest are:
- the loss of a valuable carbon sink so global levels of carbon dioxide in the atmosphere may increase leading to more global warming
 - the loss of biodiversity with its myriad of different tree, plant and animal species, many of which may harbour undiscovered benefits to mankind.
- 14** The sustainable management of the tropical rainforest involves ensuring that future generations will be able to benefit from the same goods and services provided by the tropical rainforest. This can be done by:
- protecting its biodiversity as much as possible
 - carefully planning and controlling selective logging
 - replanting forested areas once they have been felled
 - developing alternative sources of energy to reduce the amount of timber used as fuel
 - restricting the building of new roads since it is these that encourage the further exploitation of the forest.
- 15** The sustainable management of the tropical rainforest is most likely to be achieved by:
- international agreements about the importance of the tropical rainforest to the 'health' of the world and the need to protect and conserve it at all costs
 - finding substitutes or alternative sources for the resources currently taken from the tropical rainforest, for example by agroforestry (growing timber and fuel on plantations elsewhere).
- 16** a) Overall, the average temperature between 1860 and 2000 rose by nearly 0.8°C, but the rise has been a fluctuating one. There have been 'peaks' of increase at around 1870, 1880, 1940, 1960 and possibly 2000. During that time, global temperatures have also declined for short periods as for example between 1860 and 1865, and between 1900 and 1920.
- b) The graphs for global temperatures and carbon dioxide emissions overall show the same general accelerating trend, but carbon emissions have shown a distinctly smoother rise. The CO₂ plot does not show the same, quite abrupt, fluctuations as the temperature plot.
- 17** a) The main greenhouse gases are carbon dioxide, methane and nitrous oxide.
- b) The greenhouse effect is believed to be a result of greenhouse gases, released by human activities, accumulating in the atmosphere. They act as a giant one-way blanket. Solar radiation is allowed through to warm the Earth's surface. However, outgoing radiation from the Earth cannot escape into space and remains trapped in the atmosphere. Indeed, some of this radiation or heat is reflected back to the Earth's surface. As a consequence, the atmosphere becomes progressively warmer.
- 18** It is the warming of the atmosphere that causes global warming. As global temperatures rise, so the world's ice sheets and glaciers begin to melt. This meltwater is carried to the oceans and so causes sea-level to rise.
- 19** Global warming may lead to there being more energy in the atmosphere. This in turn may result in more extreme weather events and therefore more hazards such as tropical storms, tornadoes, floods, droughts and periods of severe cold.

- 20** Human health is most likely to be affected by global warming in these ways:
- Those living in low-lying coast areas run a higher risk of being injured or killed by tsunamis, storm surges and flooding.
 - Warmer climates will mean that the distributions of some diseases will spread. An example is malaria which may spread into higher latitudes and altitudes.
 - Drier climates are likely to force people to use unclean water and a number of diseases, such as cholera, typhoid and bilharzias, will become more prevalent.
- 21** A large percentage of the huge population of Bangladesh lives in areas located at or just above present sea level. So great is the overall density of population, that there is really no space for those people who will have to move away from the large areas drowned by the rising sea level. It is not just a matter of finding living space. Finding alternative farmland will also be a desperate need. The problem of dry living space will become even worse during the monsoon floods of June to September. In short, Bangladesh faces a formidable mix of challenges – more hazards (floods, storm surges and typhoons) and less space to house an already overcrowded population.
- 22** a) The countries with the largest populations and the highest industrial outputs produce the most carbon dioxide emissions. They are the USA, China, Russia, Japan and India.
- b) The main sources of carbon dioxide are:
- the burning of fossil fuels (coal, oil and gas)
 - the burning of fuelwood
 - some industrial processes.
- 23** a) The main aims of the Kyoto Treaty were to reduce global emissions of carbon dioxide and for every nation to contribute (5% global emission reduction by 2012).
- b) The Treaty has not yet come into force because not every nation has signed it. This is mainly because some governments cannot agree on the carbon quotas. LICs argue that they should not have to cut their emissions as they are only beginning to industrialise and that they contribute little to current emissions. The leading industrial nations say that their economic prosperity would be threatened if the quotas are much less than they are today. Other countries argue that since they have large carbon sink forests, they do not need to cut their emissions by as much as others.
- 24** 'Carbon sinks' are parts of the globe that are capable of absorbing large amounts of carbon dioxide, such as forests.
- 'Carbon quotas' are the amounts of carbon that countries or organisations are allowed to emit.
- 'Carbon capture' is extracting carbon dioxide from the burning of fossil fuels before it is released into the atmosphere and storing it, mostly underground.
- 25** The most important way to reduce carbon dioxide emissions is to change energy sources, moving from fossil fuels to renewable sources such as nuclear, wind, solar, hydro and tidal power. The problem is that it is difficult for these alternative sources to produce as much electricity as currently comes from fossil fuels. The most productive source would be nuclear, but there are risks attached to this.
- The use of fossil fuels will have to continue, but it is important that they are 'burned' more efficiently and that carbon capture techniques are used.
- Carbon sinks should be increased. This can be achieved by halting deforestation and encouraging the planting of more forests.

Chapter 8

- 1 Definitions are:
 - 'Globalisation' is the process, led by TNCs, whereby the world's countries are all becoming part of one vast global economy.
 - 'Interdependence' is a situation in which the economic decisions and activities in one country affect other countries and so different countries and regions come to rely on each other as part of the global economy.
 - The 'global economy' is the evolving economic system that increasingly links the countries of the world. It involves the worldwide exploitation of resources, labour and information, and the worldwide production and marketing of goods and services.
 - The 'global village' is a term used to convey the idea that people all around the world are being drawn closer together into a single global community.
- 2 The five flows involved in the growth of the global economy are:
 - trade
 - foreign investment
 - migrant labour
 - aid
 - information.
- 3 Many British companies now locate part of their production and ICT services work abroad. The factories of China and the offices of India threaten some British workers' jobs. These shifts are helping to cause an export boom in China and India where GNIs are rising rapidly.
- 4 a) 'Deindustrialisation' is a decline in the manufacturing industry in a particular region. It may be because it has become more profitable to manufacture elsewhere.
b) The global shift or relocation in manufacturing is largely from HIC to MIC, as from the UK to China. It is largely a result of the TNCs which are driven to search out the cheapest or most profitable locations for specific types of manufacturing. The shift involves many of the so-called traditional branches of manufacturing (such as iron and steel, chemicals and shipbuilding) and well as more modern consumer industries (such as clothing and electrical goods).
- 5 Many TNCs have set up factories in LICs. The three main advantages they gain from doing this are:
 - cheaper labour and land
 - labour is easier to control as there are less government regulations as regards working conditions, for example wages and health and safety
 - fewer environmental or anti-pollution restrictions.
- 6 a) Two characteristics of transnational companies (TNCs) are:
 - They are major players in the global economy in terms of influence and financial power.
 - They control complex production chains that knit together locations scattered around the world.
b) Examples of TNCs and their main business are:
 - Royal Dutch Shell – oil and gas
 - ING Group – financial services
 - Toyota – motor vehicles.
- 7 TNCs operate globally in these ways:
 - Whilst their headquarters are located on one country, they have business interests (branch plants and offices) scattered around the world.
 - They have very long production chains, for example there are often huge distances involved in the manufacture of a pair of jeans with the cotton, synthetic fibres and zips etc. all being made in different parts of the world.
 - Mining companies often mine a wide variety of resources in different parts of the world. For example, the British Australian mining company Rio Tinto not only mines Namibia's deposits of uranium but is also extracting other minerals in other countries.
 - Motor manufacturers assemble parts made in many countries. Each company often has a number of assembly plants scattered around the globe.

- 8** Reasons for the success of Tesco as a retailer are:
- its main business is food which is a universal need
 - outsourcing of its supplies
 - highly competitive pricing of the goods it sells
 - diversification into other lines of consumer business such as insurance, home furnishings and mobile phones
 - globalising its chain of supermarkets so that there are now Tesco stores in parts of Eastern Europe and Asia.
- 9** a) The greatest cost to countries hosting TNCs is that the profits leak out of the country. This means that the host country is deprived of capital (investment) to encourage more economic development.
- b) The greatest benefits are the jobs created and regular wages. It is the spending of those wages that will help to create a demand for goods and services. Providing those goods and services should create still more jobs and support more economic development.
- 10** a) Tourist numbers in the world have risen so quickly because of:
- rising standards of living
 - more disposable income
 - more leisure time, mostly in the form of statutory holidays
 - more retired people who can travel
 - relatively cheap air transport so that cost-distance values are reduced
 - destination promotion by mass media.
- b) Tourism is an important global activity because:
- it is labour intensive and supports millions of jobs
 - it is one way in which HICs can 'help' the economic development of LICs
 - it is contributing to the growth of the global economy and the global village, thus making places more interdependent.
- 11** a) Ecotourism is a form of tourism that tries to minimise its environmental impacts by using local resources and labour, and by keeping profits within the local area.
- b) Its main advantages are:
- it benefits local people in terms of generating work
 - profits stay in the local economy
 - it protects biodiversity and the environment
 - it respects local culture and traditions
 - it has a shallower ecological footprint than other forms of tourism
 - it is sustainable.
- 12** a) A 'package holiday' is a holiday in which travel and accommodation are put together by a tour operator and sold as a relatively cheap package.
- b) It is a popular form of tourism because it:
- is relatively cheap
 - offers tried and tested destinations with the elements that many people expect of a holiday, that is sun, sea and sand
 - is heavily promoted in the mass media
 - is relatively organised and an easier option for people.
- 13** Economic benefits of mass tourism are that it:
- creates employment and the wages of employees help to boost the local economy
 - creates a demand for souvenirs which in turn encourages the growth of craft industries
 - creates a demand for food and a range of services which in turn create jobs
 - gives some LICs a basis for economic development.
- 14** Some of the socio-cultural impacts of tourism are:
- in some places, it has revived traditional handcrafts and performing arts
 - it makes tourists aware of cultural differences and different codes of behaviour so it can be 'educational'
 - some tourists engage in offensive loutish behaviour, failing to observe dress codes and consuming too much alcohol
 - results in more crime and the corruption of local people.

15 The environmental impacts of tourism include:

- clearance of fragile habitats (such as mangroves) to provide space for tourist infrastructure (hotels, restaurants, etc.)
- damage to coral reefs by tourists (snorkelers, yachts, effluent, etc.)
- pollution of beaches, inshore waters, lakes and rivers by rubbish and sewage
- overuse of water resources
- traffic congestion, air, noise and visual pollution.

16 'Making tourism more sustainable' means making tourism 'greener' by reducing its adverse impacts on the environment and local culture. This can be done by cutting back on the use of non-renewable resources, minimising pollution and the disfigurement of scenery. It can also involve ensuring that tourism becomes more 'local' and less in the hands of tourist TNCs. Reducing the air miles involved is another way to make tourism more sustainable.

17 The strengths of tourism in Bhutan include having less tourists rather than following a mass tourism approach. There is tight governmental control to ensure that profits do not leak out of the country and to protect both the environment and culture.

Weaknesses are the very high costs (including surcharges) of a holiday in Bhutan. This means that it is mainly a destination for more wealthy tourists. Tourists have to be escorted all the time. There is therefore no chance for individual exploration or interaction with local people. This means that tourists are unable to learn about Bhutan's people.

18 The difference between:

- migration change and natural change is that migration change is that part of overall population change that is due to net in- or out-migration. Natural change is that part of overall population change resulting from the difference between birth and death rates
- migration involves a change in residential location, usually for more than one year. Circulation covers all other population moves that are of shorter duration. Much circulation occurs on a daily basis, such as commuting and shopping
- international migration and internal migration is that international migration occurs between countries, while internal migration occurs within a particular country.

19 Figure 8.17 shows the global distribution of population change at a national level. It is therefore only taking into account international migration, that is, the movement between countries. It is not concerned with population change within countries and therefore ignores internal migration.

20 a) Three examples of voluntary internal migration are:

- moving to a job in another part of a country
- a retirement move, perhaps from a city to a coastal resort
- moving from the inner ring of a town to a new house in the suburbs.

b) The push and pull factors in each of these examples are:

Moving to a job in another part of a country

- Push – low wages, long working hours, much of the day spent commuting
- Pull – higher wages, better working conditions, less commuting

A retirement move, perhaps from a city to a coastal resort

- Push – need to downsize to a smaller house, no longer necessary to live close to work, noise and congestion
- Pull – suitable housing, pleasant living environment, good services for the elderly

Moving from the inner ring of a town to a new house in the suburbs

- Push – old housing, poor quality residential environment, poor services
- Pull – modern housing, good services, access to the countryside.

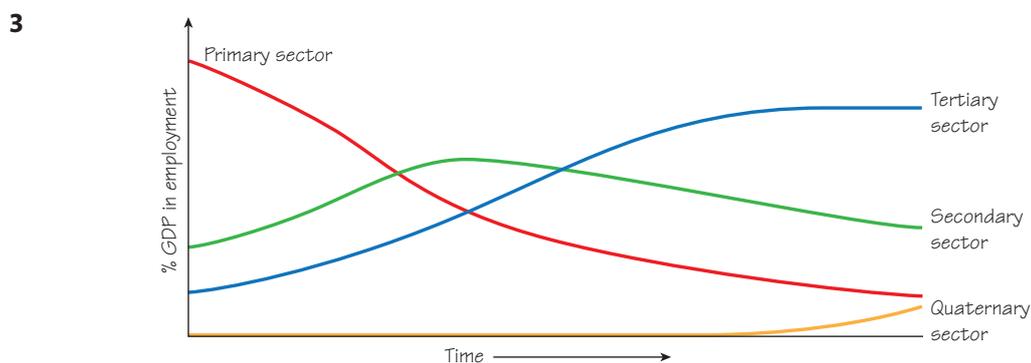
21 The popular retirement areas in England and Wales are:

- largely coastal areas, especially SW England and the South Coast, East Anglia and East Yorkshire
- scattered inland areas, usually areas of mild climate or fine scenery, like Devon and Cornwall, the Welsh borderlands, the Lake District and the Pennines.

- 22** a) A 'refugee' is someone who has left their country of nationality because they are being persecuted for their religious beliefs, ethnicity or political views. They are admitted to and allowed to live in another country. An 'asylum seeker' is someone who has left their country of nationality and has applied to be officially recognised as a refugee. So an asylum seeker is a refugee in waiting!
- b) Some examples of the 'push' factors giving rise to internally-displaced people (IDPs) are major natural hazard events, such as widespread flooding, serious earthquakes, and drought and resulting famine. But there are also more 'human' factors such as tribal warfare, battles for political power, racial or religious persecution and terrorism.
- 23** Factors that are increasing the volume of global migration are:
- more unrest in the world so more people are 'pushed' to leave their homes
 - modern transport so people are able to undertake long-distance migrations
 - globalisation resulting in large movements of labour and the relaxing of national boundaries, for example in the EU
 - modern communications that allow would-be migrants to 'see' and 'feel' potential destinations before making their decisions to move.
- 24** Some governments try to manage international migration when they feel that there is either too much – or too little net in-migration. In the former case, it might be that there are already high levels of unemployment in their country. In the latter case, it may be that a government feels that its population needs to be boosted because natural increase is not producing sufficient overall population growth or that there is a shortage of labour.
- 25** a) The strongest 'pull' factor attracting migrants to the UK is work with wages that are higher than back in their home countries.
- b) Some of the opposition to the arrival of immigrants in the UK is the fear that:
- they are taking jobs away from UK citizens
 - they are taking advantage of social welfare benefits
 - they are not paying income tax
 - they are taking over the housing in particular localities.

Chapter 9

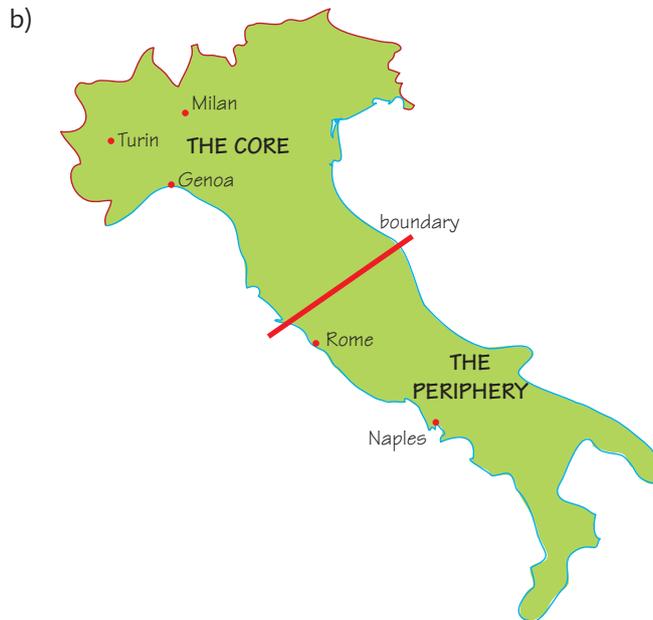
- 1 a) GDP stands for gross domestic product. This measures the value of all the goods and services produced and provided in a country in a year.
- b) The advantages of using per capita GDP as a measure of development are that countries vary in their physical size, their total populations and the size or value of their economies. Expressing this total value per head of population creates a more even playing-field for a better comparison of countries.
- 2 There are three main forces behind economic development. They are:
 Resources – examples are soils, climate, minerals, the quality of labour, capital, technology
 Internal boosters – examples are national pride and ambition, government support and business culture
 External boosters – examples are globalisation, geopolitics, TNCs and international development agencies.



Changing importance of sectors as an economy develops

- 4 Energy consumption is a good indicator of economic development because:
 - Generally speaking, people who enjoy a high standard of living consume more energy. Examples are electricity for domestic appliances and for heating swimming pools, and fuel for the family's cars.
 - At a public level, developed countries will consume energy for transport, street lighting, health and education services and air conditioning in shops, offices and hospitals.
 - Energy consumption will also be raised as countries industrialise.
- 5 a) Indicators of quality of life are
 - housing
 - secure employment
 - health
 - education.
- b) This question will no doubt raise some interesting and revealing answers!
- 6 a) 'Disposable income' is the amount of money a person or household has available to spend on non-essential items such as restaurants, holidays and hairdressers (after they have paid for their food, clothing and household running costs).
- b) The 'cycle of wealth' can be described like this: If you are born into a wealthy or 'comfortably off' family, you will be encouraged to do well at school and will be able to take part in a range of 'out-of-school' activities. Going on to higher education should lead on to a secure, well-paid job. You marry and are able to give your children a similar secure upbringing. You inherit from your parents when they die and that adds to your general level of wealth. Similarly, when you die, your children will inherit your wealth.

- 7** Over much of the world, more than 90% of the population have access to clean water. That includes most of North and South America, Europe, Russia, Australia and New Zealand. Over much of Africa, the Middle East and southern Asia the level of access is less. This is particularly the case in many parts of Africa where access falls to less than 60%.
- 8** There is a broad similarity between where more than 90% of the population have access to clean water and where illiteracy rates are less than 10% (Brazil in South America is an obvious exception). High rates of illiteracy are conspicuous in a belt that includes Africa, the Middle East, and south and south-east Asia. In much of this belt, less than 75% of the population have access to clean water.
- 9** a) HIC (high-income country): relatively well developed and prosperous countries such as the UK, USA and Japan
 NIC (newly-industrialised country): countries which have enjoyed much economic development over the last 30 to 50 years such as South Korea, Taiwan and Malaysia
 MIC (middle-income country): a mix of recently-industrialising countries such as Brazil, China and Mexico; and countries undergoing less rapid development such as Morocco, Romania and Indonesia
- b) The 'development staircase' is the pathway or sequence of steps or events involved as a LIC moves towards becoming an HIC. Each step on the staircase represents a distinct stage in the climb to become more developed. These steps or stages provide a basis for classifying countries.
- 10** a) Ethiopia is classed as an LIC because its per capita GDP is below \$100 which is a threshold used for identifying the least economically developed countries in the world.
 b) The term used to describe rapidly growing economies is RIC (recently-industrialising country) or emergent economy.
 c) The main reasons for the poverty and low development levels within Ethiopia are:
- overpopulation
 - scarce resources
 - poor education and skills training
 - lack of capital
 - political unrest.
- 11** a) An 'emergent economy' is a second generation of recently-industrialising countries which are moving up the development staircase at a fast rate
 b) Three examples are Brazil, India and China.
- 12** a) Three countries classified as having 'stagnant economies' are Myanmar, Sudan and Ethiopia.
 b) The main obstacle to their development is:
- Myanmar – unelected (undemocratic) military government
 - Sudan – civil war
 - Ethiopia – poor resources, both physical and human.
- 13** a) The 'global development gap' is the difference between the rich and poorest countries of the world. The differences are to do with levels of development, standards of living and quality of life. Various names are given to the two sides – North and South; HIC and LIC; and developed world and developing world.
 b) The reasons for this gap are.
- differences in natural resources: some countries are rich in resources whilst others have few
 - differences in human resources: different levels of education, skills and enterprise
 - access to technology: technology is critical to development
 - exploitation: the rich have been inclined to exploit the poor thus maintaining, if not widening the gap.
- 14** a) The 'core' of a country is where much of a country's population and economic activity are concentrated. It is the most prosperous part of the country. By comparison, the 'periphery' is less developed and less prosperous. There is much migration from the periphery to the core, not just of people but also of economic activities.



The core and periphery of Italy

- 15** a) The 'multiple deprivation index' is a measure used in England and Wales to assess the degree of deprivation or hardship in particular areas. It is based on a number of measures.
- b) The indicators involved in calculating the index are:
- income
 - unemployment
 - health and disability
 - education, skills and training
 - access to housing and services
 - crime
 - environmental quality.
- 16** a) Answers here will differ depending on the home country selected. Students must interpret the map and the key correctly.
- b) Reasons why distribution is so unequal in Brazil are:
- It is one of the emergent economies. The people leading the country's development are obviously making much money.
 - Landowners are the traditional rich, particularly those whose lands contain minerals or are located in or close to the major cities
 - Workers, vital to the economic boom, are being exploited. Many are made to work for and live on low wages
 - In the remotest parts of Brazil, there are tribal people living at a minimal subsistence level and who are extremely poor.
 - There are relatively few people (middle classes) occupying the gap between these two extremes.
- 17** a) The global population has risen from around 1 billion in 1800 to 6 billion in 2000. For much of this time, the rate of growth has been accelerating, as between 1900 and 1975. This is reflected in the number of years it has taken to add another billion to the world's population.
- b) The rate of growth of the world's population is projected to decline very slightly between 2000 and 2050, but nonetheless it is expected to reach 9 billion by 2050.
- 18** a) Natural population increase is the difference between the number of births in a year and the number of deaths. Natural increase only occurs if births exceed deaths, that is, if the birth rate is higher than the death rate.
- b) Birth rates are generally high in LICs because there is:
- less awareness of birth control
 - less access to contraception
 - the perception that children are an economic asset.

- 19** Some of the symptoms of overpopulation are:
- much homelessness
 - environmental degradation
 - unemployment or underemployment
 - poor education and healthcare
 - lack of clean water and proper sewage disposal.
- 20** Education is important in the fight against poverty because it can be a key intervention that breaks the cycle of poverty. Better schooling means better access to better jobs. Educating girls is particularly critical. Educated girls are more likely to know about contraception and family planning. This should mean fewer teenage pregnancies and smaller families. Educated girls are more likely to work and help increase household income.
- 21** a) Many believe that it is necessary for governments to try to change population growth rates in order to bring population numbers into balance with things such as food supply, resources and development opportunities. Growth rates may be influenced or changed in both directions – increased or decreased.
- b) Two other ways of slowing population increase are to:
- encourage emigration
 - control immigration.
- c) A government might try to increase the growth rate by offering couples incentives to have more children or by encouraging immigration.
- 22** a) Your brief report explaining China's population policies since 1970 should recognise three periods and these will provide a good structure for your report:
- 1970 to 1979: There is much advertising and active promotion of family planning programmes.
 - 1979 to 1987: The one-child programme is firmly implemented because the preceding voluntary programmes did not cut the birth rate by very much. There were severe penalties for those couples having more than one child.
 - Since 1987: The one-child policy has been relaxed in a series of small steps allowing rural couples and those belonging to minority groups to have more than one child, particularly if the first was a girl.
- b) Some of the consequences of those policies have been:
- gender-selective abortions (to avoid having a girl)
 - 'little emperors' (spoilt one-child boys)
 - unbalanced sex ratios (many more men than women, and wives in short supply)
 - labour shortages in rural areas.
- 23** a) 'Aid' is the help given to one country by either another country or by an international organisation. The help can be in the form of money, loans, goods or technical assistance.
- b) Many LICs need aid to get them moving along the development pathway so that their people can enjoy a better standard of living and quality of life. In many LICs, there are real obstacles to development, for example a lack of capital and technology.
- 24** a) The four main types of aid are:
- official aid – aid provided by governments
 - multilateral aid – a government donates to international organisations, such as UNESCO and the World Bank, who actually deliver the aid
 - bilateral aid – aid given directly by one country to another
 - voluntary aid – aid provided by non-governmental organisations such as Oxfam, Christian Aid and other charities.
- b) The advantages and disadvantages of receiving aid are:

Advantages	Disadvantages
Can help the development process	Countries can come to rely too much on aid
Helps deal with emergency situations	Aid often has conditions attached (tied aid)
Other members of the global community become aware of a country's particular needs by way of aid	Aid in the form of loans can lead to a spiral of increasing debt

c) 'Tied aid' means that there are conditions attached to the granting of aid to a particular country. It might be that the receiving country has to provide specific resources, such as minerals, in return. Aid may be in the form of a financial loan which has to be repaid within a given period and with interest. This can be a problem to the development of a country.

25 a) An NGO is a non-government organisation funded by voluntary contributions rather than by governments. Many of the well-known NGOs operate at an international level and exist to cope with global issues.

b) Figure 9.33 shows that Oxfam spends most of the money it raises either on providing various forms of aid to the developing world (38%) or on relief (aid) in emergency situations such as after major hazards and conflicts. 17% is spent on planning and organising this development and emergency aid work, and 6% on campaigning and making the world aware of the work that it does. The overall management and administration of Oxfam accounts for only 2%.

26 a) 'Free trade' is trade between two or more countries which is not obstructed by trade barriers such as tariffs and import restrictions.

b) In theory, free trade should exist within the European Union and other trade organisations but even within the EU, individual countries can take actions to protect their own trade. Many so-called free trade agreements make trade with countries outside the agreements more difficult for the rest of the world. Global trade mostly favours HICs at the expense of LICs.