

Population dynamics

2022年11月29日 18:31

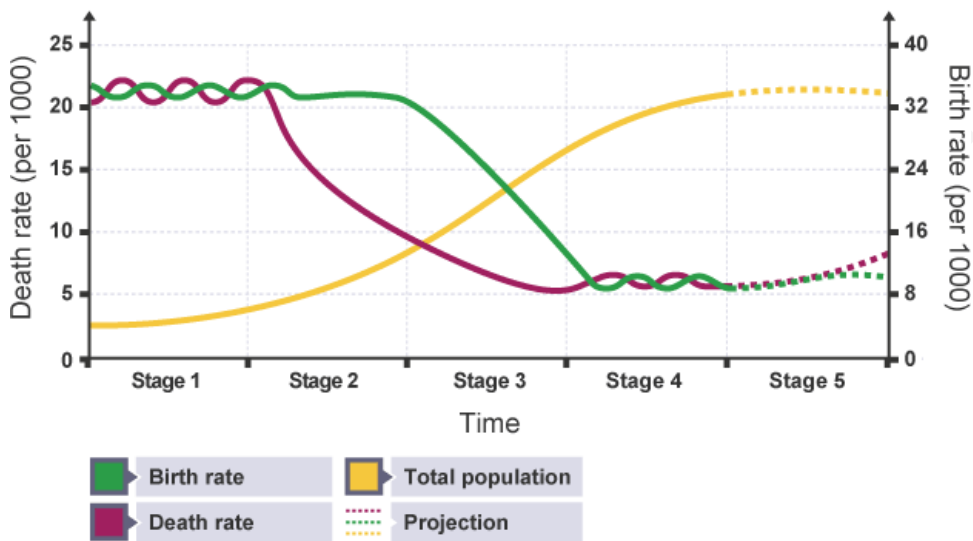
Keywords

- <https://quizlet.com/cn/751161163/flash-cards/>

Global population change overview

- Population reached 1 billion in 1804
- Rose slowly to reach 2B, by 1927
- It then rose rapidly, 7B in 2012 and 8B in 2022
- Still increasing but at a slower rate
- Predicted to level off at 10-11B

Demographic transition model



- Stage 1
 - Tribes in the Amazon
 - High, fluctuating birth rate
 - High, fluctuating death rate
 - Low natural increase
- Stage 2
 - LEDCs in Sub-Saharan Africa
 - Birth rate stays high
 - Death rate falls
 - Increasing natural increase
- Stage 3
 - NICs
 - Birth rate decreasing rapidly
 - Death rate continues to fall but slower
 - Natural increase getting smaller
- Stage 4
 - MEDCs
 - Low birth rate
 - Low death rate
 - Low natural increase
- Stage 5
 - Germany, Japan
 - Decreasing birth rate
 - Death rate slightly increasing
 - Negative natural increase

- Birth rate takes longer to start decreasing because parents take some time to realise the changes

Global distribution of birth rates

- Countries with high birth rates of more than 35/1000 are mostly in Sub-Saharan Africa e.g. DR Congo
- Afghanistan also has high birth rates but not in Africa so it is an exception
- Countries with low birth rates of less than 10/1000 are mostly in Central Europe + Eastern Europe e.g. Germany
- Japan + South Korea in Asia also have low birth rates

Reasons for high birth rate

- Lack of education on family planning
- People do not use contraception as they may be too expensive
- Children are an economic asset so they can work on the farm or earn income
- High infant mortality so people have many children to ensure that some survive
- Children needed to look after parents in old age if there is no pension
- A son is needed to pass on the family name or inherit family business
- Region on culture encouraging giving birth
- Women uneducated leading to early marriage, weak emancipation of women

Global distribution of death rates

- Countries with high death rates of more than 16/1000 are mostly in Sub-Saharan Africa
- Afghanistan also has high death rates but not in Africa so it is an exception
- Countries with low death rates are mostly in Americas, e.g. Brazil

Reasons for high death rate

- Poor healthcare - few doctors nurses and hospitals per person
- No vaccination programme so people die from diseases e.g. polio or TB
- Unclean drinking water so people die from water borne diseases like cholera
- Poor hygiene in homes and lack of sanitation system
- Poor diets due to unreliable food supply so people die from malnutrition or starvation
- More wars or conflicts

Population structure

2022年11月29日 18:31

Keywords

- <https://quizlet.com/cn/751625622/flash-cards/>

Demographic groups

- 0-14: Young dependents
 - School age
 - Depend on other for resources
- 15-64: Economically active
 - Potential working population
 - Pay taxes to support the dependents
 - The productive part of the population
- Over 65: elderly dependents
 - Do not usually work
 - Depend on others for resources

Dependency ratio

- $$\frac{\% \text{ of young dependents} + \% \text{ of old dependents}}{\% \text{ economically active}} \times 100$$
- Dependency ratio of 100 means that for every person of working age there is 1 person who is dependent
- Dependency ratio over 100 means that for every person of working age there is more than 1 person who is dependent
- Lower dependency ratio is better
 - More economically active people take care of 1 dependent an average

Population pyramid

- Australia (MEDC)
 - Beehive shape
 - Narrow base, few young dependents - birth rate is low
 - Wide apex - death rate is low
 - High % of people over 70 - life expectancy is high
 - More women elderly dependents than men - women have a higher life expectancy than men
 - Same number of children in 0-4 and 5-9 age group - birth rate is remaining low
- Bangladesh (LEDC)
 - Wide base with a large number of young dependents - birth rate is high
 - Narrowing base shows decreasing birth rate
 - Narrow top - death rate is high
 - Small % of people over 70 - life expectancy is low

Ageing populations

- MEDCs usually have an ageing population with a high % of elderly dependents (above 65).

Population distribution

2022年11月29日 18:35

Describe distribution

- Unevenly distributed
- Areas of high population density
 - South Asia
 - East Asia
 - Western Europe
 - NE USA
- Areas of low population density
 - Polar regions north of 60° N
 - Central Asia
 - High mountain regions e.g. Himalayas
 - Arid deserts e.g. Sahara
 - Rainforests e.g. Amazon

Physical factors

- Climate
 - Polar
 - Sparsely populated
 - Too cold for comfortable living, many months below 0°C
 - Difficult to construct buildings or transport networks on permafrost
 - Very short growing season (over 5°C to grow crops) so limited food production
 - e.g. Siberia, most of Canada
 - Tropical deserts
 - Sparsely populated
 - Low rainfall and infertile sandy soil so limited food production
 - Unstable sandy/rocky ground so difficult to construct buildings and transportation links
 - e.g. Sahara in North Africa
 - Temperate
 - Encourage dense populations
 - Average temperature and reliable rainfall so easier to grow food
 - Long growing season
 - e.g. Western Europe, Eastern USA, North East China
- Fertile soil
 - Contains many minerals and is well drained
 - Important in determining how much food can be grown
 - e.g. river floodplains and deltas
 - Support dense populations
- Natural resources (including energy sources like coal + minerals)
 - Area with natural resources available are usually densely populated
 - Settlements in areas with extreme climate to extract the resources
- Relief
 - High population densities in low altitude and flat land
 - More moderate climate
 - Easier to construct buildings for economic activities
 - e.g. coastlines and river valleys
 - Low population densities in places with steep gradient and high altitude
 - Cold climate with higher rainfall and snowfall
 - Thin and infertile soil
 - Difficult to use machinery
 - Thin air lacks oxygen
 - Difficult to build houses and roads so often inaccessible

Human factors

- Economic
 - Job opportunities
 - Fast, reliable transport encourages industry to locate there, providing more job opportunities
 - Transport links
 - Income
- Social
 - People migrate to areas with better social services (housing, healthcare, education etc.)
- Political
 - The government have an important role in deciding where industry, transport, housing, public, services, etc. are located
 - This will affect where people choose to live
 - Encourages people to move out of overpopulated areas by building new settlements

Densely populated areas found in sparsely population regions

- Oasis in the desert
- Near rivers in hot, dry regions
- Mining settlements in areas with extreme environment e.g. oil attraction in Alaska
- Tourist settlements in extreme environments e.g. Sharm El Sheikh in Egypt
- Dry areas which are surrounded by marsh land
- A sheltered valley surrounded by mountains

© Xingzhi Lu 2024

International migration

2022年11月29日 18:36

Key words

- <https://quizlet.com/cn/891659197/flash-cards/>

Push and pull factors

Push factors	Pull factors
<ul style="list-style-type: none">• Natural disaster event e.g. volcanic eruption, earthquake or drought• Unemployment• War• Poverty• Political or religious intolerance• Housing shortages• High crime rates• Food shortages	<ul style="list-style-type: none">• Employment• Higher wages• Food available• Better housing and education• Higher standard of living• Political and religious tolerance• More attractive environment e.g. better climate• 'bright lights' of a city (media portrayal)

Barriers to migration

Human barriers	Physical barriers
<ul style="list-style-type: none">• Border controls and police• Language barrier• High cost of journey• Visa required	<ul style="list-style-type: none">• Wall or fence at the border• Extreme natural environment to cross• Long distance between countries• Sea or ocean between countries

Challenges new immigrants might face

- Not being able to speak local language so difficulty communicating
- Not having enough money to afford housing or food
- Not finding it easy to find a job / not having the skills needed to get a job
- Not understanding the local culture or laws

Underpopulation Australia

2022年11月29日 19:16

Basic information

- Population total: 23 million in 2017
- Natural increase = 0.4% (4/1000)
- Resources available:
 - Mining
 - World leading producer of iron ore and the second largest producer of gold, lead and zinc
 - Major producer and exporter of coal.
 - Agricultural products
 - Wheat, sugar cane and cattle
 - Land
 - The country is sparsely populated (very low population density) with large areas of land unused

Reasons for low population growth

- Birth rates are low at 12/1000 because:
 - High cost of raising children
 - High education standards for women
 - Many decide to have careers, marry later and have fewer children
 - High use of birth control methods: 95% of women of fertile age
- Death rates low 8/1000
- Life expectancy is long 82 years on average
- Decreasing birth rates and an increase in death rates as the population becomes older in recent years
- The birth rates are not significantly higher than the death rates

Problems caused by under-population

- Shortage of workers
 - The resources are not fully exploited
 - Large reserves of iron ore in the western desert region and coal in the 'outback' in the east not exploited
- Not enough tax
 - The working population who pay tax is low
 - The government does not have enough financial resources to pay for all the public services
 - 43% of the labour force will retire in the next 20 years
 - This will reduce the tax collection even further
- Public services close
 - Schools and hospitals in the less populated regions may have to close because there are not enough demand to support them
 - This will leave some people without easy access to public services.
- Small market to sell goods and services
 - Less demand means businesses are not so successful and there is less production
- Difficult maintain military services
 - There are not enough people or finances to set up a defence force to defend the country

Problems with low population growth

- Depopulation of some parts of the country
 - There is an increasing migration from the countryside to the cities
 - The 'outback' is experiencing depopulation
- Not enough people for the future workforce
 - A need to increase the number of immigrants into the country of working age.
 - This has led to disagreements as some Australians oppose increased immigration
- All the problems caused by under-population

Ageing population Australia

2023年1月11日 23:09

Evidence of ageing population

- Elderly population over 65 years is high at 13% of population
- % over 65 is increasing and it is predicted to reach 25% by 2050
- % of elderly is increasing because the death rates are low and life expectancy is high (82 years)
- Low % of young dependents (only 19%) as birth rate is low (12/1000)

Problems with ageing population

- Not enough working population
 - There are few young economically active people, the birth rates are low.
 - There is a shortage of economically active people working in agriculture, manufacturing and armed forces
 - In the next 10 years, Australia's labour force is expected to decrease significantly
 - → there are less economically active people to pay taxes to pay for government services
- High government cost
 - The elderly have a greater need for medical services
 - More money will need to be invested in medical care
 - Longer waiting lists for hospital treatments
 - There is a high cost to pay for pensions for the elderly
- Taxes on the working population will increase

Government actions on ageing population

- Increase immigration of young people
 - Relax immigration policy and attract highly skilled workers from abroad
- Increase the age of retirement
 - They can increase the number of working age group
 - Less pension paid and more tax income
 - Current 67 but will increase to 70 soon
- Raise taxes to pay for public services
- Introduce a pro-natal policy
 - Offering money to families who have more than two children
 - This might increase the birth rate and the percentage of young dependents.

Pro-natal policy + immigration Australia

2023年1月11日 23:07

Why is pro-natal policy needed

- Australia is under-populated
- Low population density of less than 3 people per km²
- Population is growing slowly
 - Birth rate is low at only 12/1000 and decreasing
- High education standards for women
 - Have careers
 - Marry later (average age for having first child is now 31 years old)
 - Have fewer children
- High use of birth control methods
 - 95% of women of fertile age
- Fertility rate is only 1.6 children per female

Policies taken since 1996

- The government provided financial support for families to encourage them to have more children e.g. the Baby Bonus introduced in 2004: Cash incentive of \$5000 for any couple having children
- Government paid for child-care costs e.g. spent of \$3.2 billion per year to help with child-care costs, including paying parents maternity/paternity leave for 18 weeks at the national minimum wage.
- Tax-rebate for those with children (tax paid back to parents)
 - the size of the rebate is based on the parent's earnings (high rebate for those who earn less).
- Result
 - Fertility rate increased slightly to 1.8 per woman.
 - Most increase in the outback where government financial support was most needed.
 - Still not enough to increase the population
 - Australian population is ageing so the birth rate continues to decrease
- Problems
 - The schem did not have a significant influence on the population growth
 - It was very expensive to the tax-payers
 - Scrapped in 2014

Immigration policy

- Now 28% of Australia's population was born abroad, most immigration comes from China, India or the UK.
- \$53 billion income was paid in tax by foreign born workers in 2016
- Skilled migration means skill gaps are met in important industries such as accountants, doctors and engineers.
- Increasing the cultural diversity in the workplace makes Australia more attractive to global partners, ensuring future investment and economic growth.
- Migrants are mostly young adults who marry and have children. This may increase the birth rate in future

Sparsely populated Australia

2023年1月11日 23:07

General distribution

- Population density: 3 / km²
- Uneven distribution
- More densely populated in SE cities
 - e.g. Brisbane, Sydney, Gold Coast
- Also dense around Perth in SW
- Sparsely populated in centre and north, less than 1 / km² due to hot desert environment

Higher density in SE and SW corners

- Temperate climate
 - Summer 25°C, winter around 10°C
 - Rainfall about 800mm
 - Suitable for agriculture
 - Enough water for domestic and industrial use
- First settled by Europeans in Sydney
 - Led to most of the significant economic developments along the east coast
- Several cities located close together
 - e.g. Sydney, Canberra, Melbourne
 - Close trading connections with each other

Low density in central Australia

- Desert climate
- 45% of Australia is hot desert (Great Sandy + Victorian)
- Low rainfall with less than 250mm per year
 - Not enough water for domestic use, industries and agriculture
- Isolated area
 - Great distances between small communities

Low density in northern Australia

- Tropical wet climate
- Extremely high rainfall, over 2000mm per year
- Distinct wet and dry season
- Difficult to build infrastructures because of flooding in wet seasons

Higher density in some sparsely populated areas

- Raw materials
 - e.g. coal and iron in the 'outback'
 - Creates job opportunities
- Transport links
 - e.g. Port Hedland
 - e.g. highway 1 built along the west coast to link mining settlements with coastal ports

Overpopulation + youthful population Bangladesh

2022年11月29日 19:16

Basic information

- Population total: 160 million
 - It grew from 80 million in 1980 so doubled in 50 years
- Land size: almost 144,000 km²
- Predicted growth: to 200 million by 2050
- Natural increase: 1.2%

Reasons for population growth

- Death rates have fallen to 6/1000 because:
 - Improvements in health care
 - More trained doctors and nurses
 - More health clinics
 - Infant mortality has decreased to 30/1000 per year
 - Babies are vaccinated
 - Water supply is cleaner so less water borne diseases e.g. cholera
 - Only 13% of population now do not have access to clean water.
 - Food supply has improved particularly the production of rice
- Birth rates remain high (18/1000) because:
 - High % of population are women in child-bearing age
 - Limited use of birth control methods - only 62%
 - Young age of marriage - 1/3 girls married by 18 years old
 - Bangladesh has a youthful population
 - When they reach adulthood they will have children themselves

Problems with rapid population growth / youthful population

- Poor health care and education services
 - Government does not have enough money to invest in public services for everyone
 - Most people do not have access to these services
 - 0.5 doctors per 1000 people.
- Not enough clean water for everyone - 13% do not have access to clean water which is around 20 million people
- Periodic food shortages
 - The amount of resources e.g. land, water and food have to be shared between a higher number of people
 - The amount available per person decreases
 - 33% of children under 5 are underweight
- Rapid rural urban migration
 - Many young people living in rural areas are forced to move to urban areas because there is not enough farmland available
 - This causes rapid urbanisation in the cities
 - 1000 people migrate to Dhaka each day from rural areas
- Poor sanitation facilities in urban areas - 42% of people living in Dhaka do not have a sanitation system
- Youth unemployment is high
 - The growth in population is faster than the growth of job opportunities

Causes of over-population

- High fertility rates due to the lack of availability and knowledge regarding contraception
- The majority of the population work as subsistence farmers
 - Children are regarded as an economic asset
 - People have lots of children to help them work on the farms

- There is no state pension system in Bangladesh
 - People also have lots of children to take care of them when they get old
- Bangladesh is a poor country with 25% population living below poverty line of £1.25 per day
 - Government lacks suitable medical facilities and vaccinations.
 - Infant Mortality Rate is high at 30/1000 per year
 - People have lots of children to replace those that die at a young age.
- Females are not fully emancipated

Problems caused by over-population

- Bangladesh lacks sufficient resources to meet the needs of its Population, which leads to a lowering of standards of living
 - Many people (25%) are below poverty line of \$1.25 per day
 - Government does not have enough money to pay for the public services
- Rapid growth of urban areas
 - People forced to live in poor quality housing in slums
 - Urban areas have severe traffic jam
 - Air pollution from traffic and water pollution from waste thrown into the rivers
- Overcrowded living conditions and insufficient medical services increases the spread of diseases
 - Life expectancy is only 52 years
- Insufficient clean water supply for everyone
 - An increase in water borne diseases
- Over cultivation of the land to grow rice for growing population
 - Taking too many nutrients from the soil - reducing soil fertility
 - This has caused food insecurity and malnutrition for many people
- Deforestation
 - 50% of forests have been cut down for fuel wood
- Vulnerable to climatic hazards
 - Bangladesh suffers from the tropical cyclones from the Indian Ocean, which brings flooding to where dense populations live on the fertile floodplains of the Ganges Delta

Anti-natal policy Bangladesh

2023年1月11日 23:07

Reasons for anti-natal policy

- High population density of over 1000 per km²
- Over-populated
- Population is growing rapidly because death rate reduced to 6/1000 when birth rate still high at 18/1000
 - Large % of population women at child-bearing age which is keeping birth rate high
- Population doubled between 1970 and 2000

Government action

- National Policy on population started in 1975
- Educated people on the problems caused by rapid population growth
- Encouraged small family size through an advertising campaign on TV and posters
- Increased people's access to birth control and made it affordable
- Minimum age of marriage was increased to 18 years for women and 21 for men.

Evidence of success

- Increase in % population using contraception from 18% in 1980 to 60% in 2015
- Average number of children per family decreased from 6 to 2.
- Population growth rate decreased to 1.2%

Problems of anti-natal policy

- Went against the religious belief of rural people, especially Muslims
- Some said that the campaign was very aggressive
- Rural people prefer larger families because they need children to work on their farms
- Difficult to enforce the law in rural areas
 - 65% of girl married by 18 and most had a child by 19 in traditional societies

Densely populated Bangladesh

2023年1月11日 23:08

General distribution

- Average population density about 1000 people / km²
- Uneven distribution
 - 75% in rural areas
 - 25% in cities
- Highest population density in Dhaka 50000/km², highest in the world
- High population density on Ganges river delta 500/km²
- Lowest population density in SE Chittagong hills and south coast, less than 250/km²

High density in Dhaka

- 17m live in Dhaka
- Over 1000 people migrate from rural areas to Dhaka each day
 - Attracted by potential for job opportunities and better services
- Forced to leave rural areas on south coast that are becoming flooded due to climate change

High population on Ganges river delta

- Flat land
 - Easy to build on
 - Most accessible land with road / rail networks and airports built
- Easier to grow crops
 - Fertile soil due to annual flooding and deposit of alluvium
 - Monsoon climate with high temperatures and high rainfall (over 2000mm) during wet season for intensive rice farming
- River is used to trade
 - Import raw material
 - Export manufactured goods
 - Develop industry
- Links Dhaka with Chittagong (second largest city)

Lower population density in SE border with Myanmar

- Steep sided hills rising to 900m altitude
 - Difficult to construct transport routes, less accessible
 - Thin and infertile soil, difficult for intensive agriculture
- Border with Myanmar is not secure
 - Over 0.5m Rohingya Muslim refugees have crossed the border into Bangladesh and live in refugee camps in east Bangladesh

Lower population density in south coast region

- Extremely low lying land, altitude < 10m
 - Dangerous sea water floods almost every year due to cyclones
- Natural vegetation is thick
 - Mangrove forests are unsuitable land for agriculture
- Sea level rise due to climate change
 - Even higher risk of flooding
 - Encourage people to migrate to the cities

USA Mexico immigration

2024年3月9日 15:16

Data

- According to the U.S. Department of Homeland Security, Mexico is the country of origin for the largest numbers of illegal immigrants in the USA
- 6,570,000 migrants (57% of all illegal migrants)
- More than half of the 11 million Mexican living in the US are there illegally, according to a report by the Mexican government

Push factors from Mexico

- High crime rate (10-14 homicide per 100,100)
- High unemployment and poverty rate (47%)
- Water shortage
- Drug gangs
- Low minimum wage

Pull factors from USA

- Much higher quality of life
- Existing migrant communities to seek help from
- Better education (86% literacy rate in Mexico vs. 99% in USA)
- Diverse economy for both high and low skilled jobs
- Informal jobs available

Impact on Mexico (source country)

- Positive
 - About \$13 billion sent back to Mexico as remittances per year
 - One of Mexico's most important sources of income
 - Second only to oil, surpassing the traditional tourism industry
 - When migrants return back to Mexico they are more skilled and have greater work experience which could help to develop the Mexican economy
- Negative
 - Mexican countryside has a shortage of workers
 - Certain villages have lost 2/3 of its inhabitants
 - Many men emigrate leaving a majority of women who have trouble finding marriage partners
 - Fathers and husbands are absent for years on end, women are left alone to raise the children
 - The community is growing increasingly dependent on money made elsewhere
 - Young adults tend to migrate, leaving ageing communities behind. With fewer children these communities will gradually die out
 - Hundreds of illegal immigrants who cross into the US from Mexico have died in the scorching heat of the Arizona desert

Impact on USA (destination country)

- Positive
 - Mexican migrants benefit the US economy by working for low wages
 - Mexican culture has enriched the US border states with food, language and music
 - The Mexicans supply the need for cheap labour working in low paid jobs
- Negative
 - Illegal migration costs the USA millions of dollars for border patrols and prisons
 - Tensions have risen between Mexican immigrants and Americans
 - Increasing concerns over the availability of working-class jobs
 - Mexicans are seen as a drain on the USA economy.
 - Migrant workers keep wages low which affects the wages of American citizens
 - They can cause problems in cities due cultural and racial issues
 - The incidents of tuberculosis has been increasing greatly due to the increased migration
 - Money sent back to Mexico by the immigrants (remittances) is money that is lost from the American Economy

Settlement patterns and services

2023年5月16日 20:05

Quizlet

- <https://quizlet.com/cn/803278101/flash-cards/>

Site factors

- Wet point sites
 - Have a good fresh water supply e.g. by a river or spring
 - Rivers can also be used for food resource (fish a good source of protein)
- Dry point sites
 - Away from the risk of flooding e.g. on higher land near a river
 - Avoid unhealthy marshes
 - Marsh in tropical areas are a source of water borne diseases
- Defensive sites
 - Often found on higher ground
 - Top of a hill - all round view of landscape, in the past enemies could be seen
 - Inside of a meander - protection on three sides
- Relief
 - Easier to construct buildings on flat land
 - Easier to grow crops where fields are on gentle slopes and where the soil is most likely to be fertile
 - Steep slopes usually have thin, rocky soils
- Aspect and shelter
 - (= where the slope faces)
 - In northern hemisphere villages are normally south facing slope and on the leeward slope (opposite to windward)
 - Most sunshine
 - Protected from prevailing winds
- Resources
 - Firstly a good supply of wood e.g. next to a forest
 - Later, a source of coal
- Fuel supply
 - Forest which provides fuel wood for cooking and heating
- Altitude
 - Lower altitude is sometimes better
 - Higher temperature
 - Less windy
- Bridging point
 - On a narrow part of the river
 - Easier to build a bridge to cross the river
 - Easier to travel and more accessible
- Route centre / nodal point
 - Where transport routes meet e.g. crossroads, transport link connect with rivers
 - More accessible
 - Good for trading

Settlement pattern

- Linear
 - Buildings are built along a line of communication in long thin rows
 - Reasons
 - To allow every house to access the transport link
 - Sometimes each house has an area of farmland at right angles to the road
 - Might be along a river for water supply

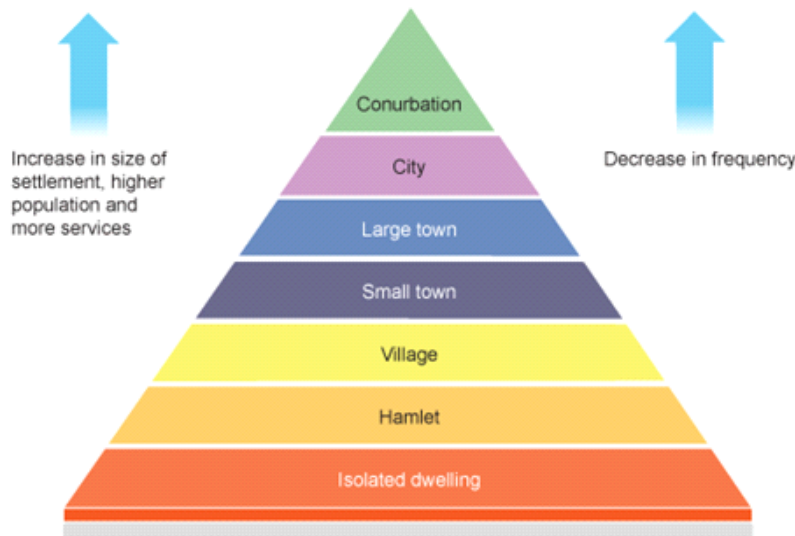
- Dispersed
 - Scattered isolated farmhouses with very few villages
 - Reasons
 - Poor agricultural land so people need to farm large areas e.g. grazing sheep
 - Hard to live in a village and travel to their land
 - Cultural reasons = no tradition to live in grouped areas
 - Huge commercial farms e.g. ranches or plantations + farmhouses separated
 - Limited resources, only support a few people
- Nucleated
 - Buildings are grouped together, initially for defence, or a common resource
 - Reasons
 - Rich agricultural land
 - Farmers can live in the village and be near the farm
 - Enjoy social benefits of neighbours
 - Easy access to services such as shops and schools
 - Help with defence in time of attacks
 - Favoured by culture

Functions of settlement

Market town	Provides services for the surrounding agricultural area e.g. selling farm products
Mining town	Where minerals are extracted e.g. coal
Industrial	Where many factories are located
Port	Located on the coast or large river where goods are imported and exported
Route Centre	Has excellent transport links e.g. roads, railways and airports
Commercial	Provides the needs of trade, industry and business e.g. financial or retail centre
Residential	Majority of residents live there but do not work there: a commuter settlement
Tourist resort	A settlement people visit for their leisure time or holidays

Settlement hierarchy

- Factors
 - The population size
 - The range and number of services
 - The sphere of influence
- The higher up the hierarchy
 - The fewer the number of settlements of that type
 - The more population size
 - More and higher order of goods and services
- Isolated dwelling - village = low order settlements, <3000
- Town = medium order < 100000
- City / conurbation = high order



Convenience / comparison goods or services

- Convenience / low order goods or services
 - Bought frequently (even every day)
 - Prices are generally cheaper
 - e.g. food stores, bakers, pharmacy
 - Sell goods that you can buy easily and for the same price all over the place
 - People will buy these goods locally and will not travel far to purchase them
 - They have a small range
 - The settlement which only has convenience goods + services is called a low order settlement.
- Comparison / high order goods or services
 - Bought less frequently
 - More expensive
 - e.g. clothes, furniture or electronics.
 - Some of them are specialist goods which are not sold in many shops
 - People will compare the prices and are prepared to travel further to buy them
 - They have a large range
 - The settlement where they are located is called a high order settlement.

Why do convenience shops and services have a small threshold population?

- People buy convenience goods frequently and visit the store often
- Although the goods are cheaper in price they are bought more frequently
- Therefore fewer potential customers are needed to support the shop
- People do not buy comparison goods very often
- The goods are usually more expensive
- The shop needs a larger number of potential customers to make sure they sell enough goods to make a profit

Why do larger settlements usually have more services?

- Larger settlements have enough people living there to reach the threshold population for most services including the high order services e.g. clothes and furniture stores as well as multiple low order services e.g. food stores
- Larger settlements provide the high order goods and services for the surrounding area as well as their own population
- The number of potential customers is increased
- This is because their sphere of influence is larger than smaller settlements

Why does the sphere of influence vary in size?

- Size of settlement and number of services it provides - larger town with more high-order services will have a larger sphere of influence

- Population density – in sparsely populated the services are more widely spread out and so the sphere of influence is larger
- Transport facilities – good transport link allow people to travel further in the same amount of time and so the sphere of influence is larger
- Competition for nearby settlements – the sphere of influence will be smaller when there is a settlement nearby which is of similar size and has similar services

Why do some settlements have more services than would be expected for its size?

- It is located in an area of natural beauty and has a tourist function with many services for tourists
- It is the largest settlement in an isolated area and so has to provide all services needed for the whole region
- The population is rich and demand for services is high

Why do some settlements have fewer services than would be expected for its size?

- It is located close to a larger settlement which has a greater variety of services
 - People choose to use the larger settlement for their services instead
- Residential function (commuter settlement)
 - People use the settlement where they work for their services instead of where they live
- The population is poor and can not afford to support a large number of services

© Xingzhi Lu 2024

Urban land uses

2023年5月17日 20:10

Quizlet

- <https://quizlet.com/cn/804098883/flash-cards/>

Land use purposes

- Business and commerce - offices and banks
- Leisure and recreation – including built services e.g. theatres or open space e.g. urban parks
- Residential - the building of houses and flats
- Transport - road and rail networks, stations and airports
- Industry – factories and storage warehouses
- Retail – shops on high street of retail parks
- Tourism facilities – hotels, museums, art galleries

CBD characteristics

- High rise buildings
- High density buildings, limited open space
- Government buildings
- Old historic buildings e.g. cathedrals or palaces
- High order retail services, such as department stores and international chain stores
- Offices, including headquarters of transnational corporations
- High order entertainment services e.g. theatres, hotels and restaurants
- Vertical zoning e.g. retail on the ground and offices on upper floors
- Route centre of public transport services, including busses and underground railways
- High traffic congestion
- Few residents, the number of people living in the CBD is low

Why CBD is in the city centre

- The original centre of the settlement
 - It has the oldest buildings and the government buildings
 - The buildings of historic importance encourage tourism services e.g. hotels to locate in CBD
- The city centre is the most accessible place
 - Roads and public transport networks meet in the centre
 - This makes the land desirable for businesses because it is accessible for customers from all parts of the city
- The high bid rent in the CBD
 - Bid rent curve theorem
 - Land uses compete = higher cost = higher bid rent
 - Only commerce can afford the bid rent so there are few houses or factories in the CBD
 - The buildings are high rise to make the most use of the expensive land
- Comparative, high order shops and services locate in the CBD
 - The population of the whole settlement has access to their businesses
 - Meet their threshold population
 - The whole settlement is within their sphere of influence

Inner city characteristics

- Low class housing originally built for factory workers in 19th century
 - Mainly terraced housing
 - Built in long straight rows + uniform (identical)
- Now often used by lower income groups such as students
- Small back gardens, very small or no front garden
- Narrow congested roads which were not originally built for cars

- Very few garages and on street parking increases congestion
- Few leisure amenities, small stores or corner shops
- In some places the old terraced houses have been knocked down and redeveloped but it is usually still high density residential with modern, high rise flats

Inner city pros and cons

- Advantages
 - Cheap and often available for rent
 - Near the centre where there are job opportunities + entertainment services
- Disadvantages
 - Areas of Industrial decline and high unemployment
 - Abandoned warehousing- eyesore
 - High crime rates e.g. vandalism
 - Overcrowding
 - Poor quality housing (except redeveloped)
 - Lack of open areas
 - Parking problems

Suburbs characteristics

- Medium density residential
- Semi-detached and detached homes
- Larger homes with larger gardens, both front and back gardens, more open space
- Most houses have garages or driveways
- Many services available including local shopping areas, schools, parks and other leisure facilities e.g. golf courses, swimming pools
- Some more modern housing estates with detached houses built since 1980s

Suburbs pros and cons

- Advantages
 - Lower cost of land
 - Better quality housing
 - Off street parking / safer
 - Less congestion
 - Close to countryside
 - More open space
- Disadvantages
 - Long commuting times
 - Higher cost of journeys
 - Higher housing costs

Rural urban fringe

- Where most of the greenfield sites are found
- Common for this area to have a mixture of land uses
- e.g. some housing, golf courses, allotments, business parks and airports
- Advantages
 - Cheap land
 - Room for expansion
 - Attractive environment, little pollution
 - Good accessibility
 - Workers available close by
 - Plenty of car parking space
- How it grows
 - Urban sprawl
 - Suburbanisation

Building on green field sites pros and cons

- Advantages

- Land may be more accessible, less traffic congestion
- Cheaper land
- People prefer more space and pleasant environment
- Allows planners to have freedom
- Disadvantages
 - Habitat destruction
 - Reduction in biodiversity
 - Increased pollution
 - Increased impermeability of ground leads to flooding

Building on brown field sites pros and cons

- Advantages
 - Redevelopment of derelict land
 - Does not harm environment
 - Creates local jobs
 - Provides boost to local economy
 - May use existing infrastructure e.g. roads, electricity
- Disadvantages
 - Land may be contaminated
 - Increases air pollution
 - Increases congestion
 - Increases overcrowding
 - Expensive land

Burgess model

- Based on the idea that land values are highest in the centre of a town or city
- The CBD is in the centre
- High-rise, high-density buildings and traditional factories will be found near the CBD (inner city)
- Low-density, housing developments will be on the outskirts of the town or city (suburbs)
- Problems
 - The model is old and was developed before the car ownership, which has led to the development of the rural-urban fringe
 - It does not include the influence of the redevelopment of the old industrial zones in the inner city
 - Every city is different. There is no such thing as a typical city.
 - The physical geography of the landscape can influence the settlement pattern. For example, a river or an area of higher land

Hoyt model

- Based on the circles of the Burgess model, but adds sectors of similar land uses
- The CBD is in the centre
- The factories/industry zone follow the line of a transport link (main road, a railway or a river) for transportation of raw materials and produced goods
- The working class housing is located next to the factories
 - It is a less desirable place to live with the high pollution level and there is the advantages for the workers to live in walking distance from their work

Problems of the CBD

- Increasing car ownership
 - Lead to congestion so inaccessible, slow down journey times
 - Lack of parking space
- Decline of retailing
 - Smaller shops leave because they cannot afford the high rent
 - Larger shops have moved out as well
 - Reasons
 - Shops such as DIY stores, furniture shops and carpet shops have moved to brown field sites

- Major department stores and hypermarkets have moved to green field sites with more parking space and cheaper land
- Major growth in online shopping so loss of customers
- Decentralisation of companies and administration
 - Relocated to new better premises on the outskirts of the town for cheaper land and more parking space
- CBD in evening
 - Can be very empty
 - Unsafe (high crime rate) if the only services open are bars, restaurants and nightclubs
- Twilight zone
 - Problem areas in the transition zone of the CBD
 - Particularly affected by change
 - Improved if CBD expands in that direction
 - May also decline from derelict land and buildings; high crime rates and social problems

CBD problem solutions

- Pedestrianisation
 - Traffic free areas or only allow delivery vehicles at certain times of the day
 - Create a safer, more relaxing environment with less pollution
- Shopping malls
 - Undercover shopping areas
 - Shoppers can look around to compare the prices while ignoring the weather
 - Air conditioned / heated
 - Often try to have at least a major department store to encourage other shops to locate
- Visual improvements
 - Provide flowerbeds, seated areas, trees and hanging baskets
 - Introduce pavement café and bars
 - Find new tenants to occupy vacant buildings as soon as possible
 - Street cleaning and waste collection
- Security
 - Police / private security firms
 - CCTV to deter pickpockets and shoplifters

Decline of inner city

- Closure of factories
 - Relocation due to rural urban fringe or even abroad for cheaper production cost
 - High unemployment, social problems old housing in the city

Internal migration / causes of urbanisation

2023年6月12日 19:50

Quizlet

- <https://quizlet.com/cn/807395528/flash-cards/>

Urbanisation

- The increasing % of the population living in towns and cities
- Causes
 - Rural urban migration
 - High natural increase (birth rates higher than death rates) in urban areas
 - Youthful population in urban areas
 - In-migrants are young adults

Causes of rural urban migration - push factors

- Rural overpopulation
 - Quality of life poor in rural areas
 - Rapid population growth has put pressure on agricultural economy
- Mechanisation of agriculture
 - More machines means less need for labour
 - Less job opportunities
- Tribal conflict
 - Violence and lack of government forces to ensure safety in isolated areas
- Falling harvests
 - Possibly because of drought, poor farming practice, water shortages and climate change
- Natural disasters
 - Less assistance is available in rural areas
 - People migrate to cities after a flood
 - Drought may lead to famine
- Poor social services
 - Very high people per doctor ratio
 - Few education prospects

Causes of rural urban migration - pull factors

- 'Bright Lights Effect'
 - Opportunities available for exciting life with leisure opportunities, sports tournaments, cinemas, festivals
- Medical services
 - Easier to get medication for sick offspring
- Broad range of employment
 - e.g. factory / informal economy
 - Chance to increase income and remittances
- Education
 - University courses and further education available in cities
- Tolerant community
 - Cities are often more 'liberal' rather than conservative, diverse
 - Minority groups such as religious or ethnic minorities will not be persecuted in urban areas
- More job opportunities
- Higher income
- Higher SoL
- Lower level of crime
- * All are perceptions

Obstacles of rural urban migration

- Higher cost of living in cities
- Lack of skill, can only make livings in rural areas
- Family connections / friends living in rural areas may discourage migration
- Lack of capital / money to move
- Lack of safety e.g. passing war zones
- Government policy

© Xingzhi Lu 2024

Impacts of urbanisation on people and natural environment

2023年6月12日 19:50

Impacts of rural urban migrations on rural areas

- Positive
 - Remittances (money sent home by workers)
 - Improve quality of life and SoL
 - Buy more seeds / machineries for the farm
 - Open shops
 - Improve home / move to better home
 - Less pressure on food and water resources
 - More job opportunities
- Negative
 - Young people have left the villages so losing the most capable workers
 - Field go untended and reduce crop yields
 - Ageing population left behind
 - The rest of the village may have to leave the village as well

Impacts of rural urban migrations on urban areas

- Positive
 - Gain able young workers
 - Workers are motivated and hardworking, good work ethics
 - Provide an increased market as migrants spend money on goods and services
- Negative
 - Migrants need to find work quickly and may cause conflicts with existing population
 - Too many migrants coming in = overcrowded
 - Migrants may be exploited by their employers by paying low wages for long hours in unsafe working conditions
 - New migrants often live together and create squatter settlements

Characteristics of squatter settlements

- Densely populated
- Buildings tightly packed together
- Homemade houses
- Poorly built structures
- Lack of infrastructure e.g. limited sanitation, clean water, or electricity

Problems of squatter settlements

- Insufficient housing
 - Shanty towns develop
 - Poor quality housing built by residents
 - People live in slums settlements with limited infrastructure e.g. lack of electricity or clean water supply
 - Some housing is located in dangerous positions e.g. on steep slopes so vulnerable to landslides or next to rivers which could flood
- Inadequate transport infrastructure
 - Limited public transport / overcrowded public buses and poor road networks
 - Causes traffic congestion
 - Leading to high air pollution
- Waste management problems
 - Municipal waste and industrial waste in landfill and rivers
- Poor sanitation
 - Raw sewage emptied into rivers
 - Leads to water pollution and waterborne diseases

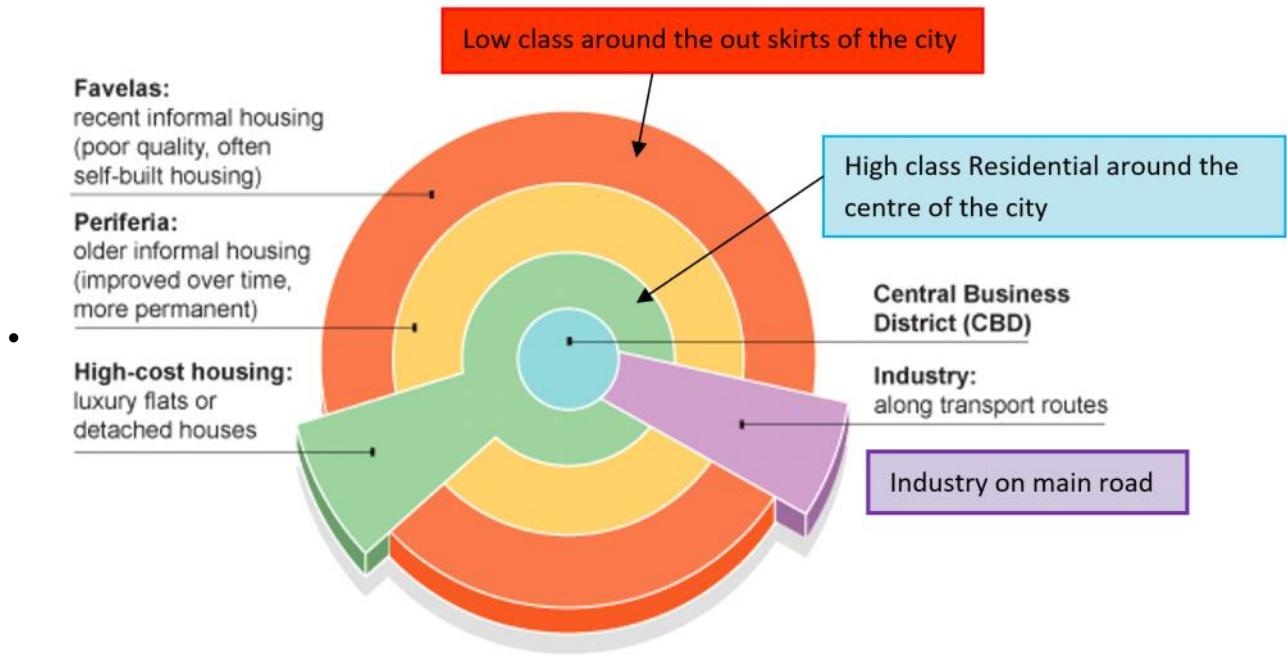
- Disease may break out
- Lack of jobs with regular income
 - Leads to unemployment and an increase in informal employment
 - Can lead to exploitation by employers because it is not regulated
 - Lack of tax revenue because workers do not pay tax
- Crime gangs
 - Fill the vacuum left by lack of jobs
 - Limited police presence
 - Often related to drugs
- Pressure on schools
 - Inadequate education provision
- Pressure on medical services
 - Inadequate medical care provision
 - Disease spreads easily
- Inequality in wealth, housing quality, living standards between the wealthy and the poor living in shanty towns

(Negative) Impacts of urbanisation on the environment

- Loss of habitats
 - Loss of greenspace due to land cleared for shanty town development
 - Impacts food chain and reduces biodiversity.
- Pollution of rivers
 - From industrial waste dumped in rivers and untreated sewage (caused by insufficient sanitation systems)
 - Causes death of fish / other species.
- Pollution of ground water
 - Seepage of toxins from industrial waste and sewage infiltrating into ground
- Air/atmospheric pollution
 - From factories and power generation burning fossil fuels
 - From domestic fires (fires in the homes)
 - From increased traffic congestion

LEDC Housing model

- CBD is located in the city centre because the land is the most accessible
- Industry is located in sectors along the main transport routes out of the city
 - Could be along main roads, railways, rivers, or canals (artificial rivers)
 - Usually built on flat land.
- High class housing is located around the CBD
 - Close to the job opportunities and entertainment services in the CBD
 - The luxury apartments are around the CBD where the land costs are higher
 - The housing is in a sector stretching along transport links to the CBD
 - On the other side of the city from the industry to be away from the pollution
- Middle income housing / periferia
 - An area of informal housing that was built several decades ago
 - People have had the time and some money to improve their homes
 - The government have provided some infrastructure e.g., electricity and there will be some schools and medical facilities → public services
- Low-income housing / slum / favelas / shanty town / squatter settlement
 - On the outskirts of the city
 - An area of recent informal housing which is self-built and poor quality
 - Limited infrastructure or services available to the people



© Xingzhi Lu 2024

Service provision South Shropshire

2023年5月17日 18:57

Settlement hierarchy

- How important different settlements are judged by population and order of services

Shrewsbury

- The county town of Shropshire
- Large market town
- Population of about 70,000
- A highest order settlement in the hierarchy of Shropshire.
- It has a variety of high order services
- Two hospitals – one NHS and one private.
- There are several shopping centres within the CBD
 - Pride Hill
 - High street chain stores such as Marks and Spencer and Boots can be found
 - Darwin centre
- A range of independent retailers
- Abundant number of charity shops and restaurants
 - Both fast food and high end dining
- A range of fitness and leisure centres and plenty of entertainment opportunities
 - Theatres and cinemas
- On the outskirts of the large town, there are various retail parks, such as Meole Brace
 - Supermarkets and chain stores have established
 - Taking advantage of the cheaper land and high accessibility.
- Shrewsbury is accessible with three park and rides, many bus services and a railway station which links to Birmingham as well as being located near the motorway M54.

Acton Burnell

- A small village located 8 miles south of Shrewsbury and with a population of just 544 (not including the boarding school students)
- It has only a few low order services
- A post office which sells convenience goods, such as newspapers, sweets, bread, eggs and milk
 - Providing this service for the surrounding villages.
- There is an international boarding school in the village for over 500 students
 - Provides considerable local employment
 - The college also hosts cultural events that local residents can sometimes attend and its swimming pool is used by a nearby primary school
- The students from the College provide the threshold population required to keep the post office economically viable
- Acton Burnell also has a church but services are not weekly and a waste collection service.
- A bus service to Shrewsbury does operate but the service is infrequent

Land use pattern Shrewsbury

2023年5月18日 17:26

Burgess model

- CBD
 - 1km²
 - Defensive site: inside meander of River Severn
 - Higher rise up to 4 floors, high density
 - High order shops: Darwin Shopping Centre, Pride Hill, indoor market
 - High order services e.g. restaurants and cinema, theatre
 - Tourist attractions: tourist info / museum / art gallery / cinema
 - Route centre: bus & train station. Traffic congestion → accessible
 - Limited open space: the Quarry, a public park, next to river on floodplain
 - Historical buildings: castle, cathedral
 - Meets the threshold population
- Castlefield NE
 - Terraced, high-density inner-city housing
 - Little or no open space
 - House railway workers from industrial revolution
 - Traditional Victorian housing
 - Low order services
- Suburban expansion SW
 - The largest land use in the town by area
 - Detached and semi-detached
 - Low-density housing
 - Built since 1950s.
 - High income housing

Hoyt model

- New developments built on rural-urban fringe
 - Meole Brace retail park
 - Housing estates in Bowbrook
 - Shrewsbury Town Football Club stadium
- New infrastructure
 - New park and ride
 - A5 bypass built on rural-urban fringe, form a ring road
- Land to NW left undeveloped
 - Low economic value green field site
 - Low-lying flood plain for the River Severn.
 - Susceptible to flooding
- Battlefield Retail Park
 - New industrial and retail space. Large buildings on map

Rio de Janeiro

2023年6月14日 16:23

Background facts

- Rio's population increases by 1 million every 10 years
- Population 6 million or 12 million for total metropolitan area
- Caused by land degradation, over-population and periodic droughts in rural regions
 - e.g. NE Brazil
 - Resulted in rural-urban migration to Rio

Problems + advantage of rural urban migration for the rural area

- Problems
 - Loss of young adults / workforce
 - Lack of labour for farms, some farms abandoned
 - Families split up
 - Usually fathers migrate first
 - Leaving women, children and elderly people in village
 - Aging population in rural areas
 - Increasing dependency ratio
 - Depopulation of rural area
- Advantage
 - Migrant sends remittances (money) back to family
 - Can be invested to improve housing and farm in rural areas

Problems of rural urban migration for Rio de Janeiro

- Has 750 favelas
 - Favelas = housing areas which often lack basic amenities such as running water, sewerage and electricity
 - Slums, lack basic amenities
 - Rocinha is the largest favela with 100,000 - 300,000 residents
- Many are built on steep hillsides, near risky areas such as electricity cables/railways, chemicals factories
- Landslides can occur and kill people during heavy rains
- Police have little control in many favelas and these areas are often run by dangerous rival drugs gangs
- **Add general ideas of problems of squatter settlements**

Housing issues and inequality

- Segregation of the population by socio-economic level
 - Wealthier population live in high quality homes near CBD
 - Poorer population including recent migrants to the city live in shanty towns on the outskirts of the city
- Poor quality housing and living standards in shanty towns
 - Densely populated
 - Homemade houses
 - Poorly built
 - Tightly packed
- Squatter settlements
 - Residents could be evicted
- Informal settlement
 - Limited sanitation and water supply provision
 - Can lead to outbreaks of disease
 - No electricity supply or it is illegally tapped which is dangerous
- Overcrowding

- Whole families in one or two rooms
- High levels of crime often related to drugs
- Located on outskirts of city
 - No local employment
 - Must travel far to work with poor road structure & limited public transport

Housing issues and inequality evidence

- Sao Conrado compared with Rocinha
 - Located next to each other in southern Rio
- Sao Conrado is a beachside location
 - 21,000 population in 6.5km² so population density = 3,000 per km²
 - High-rise luxury apartments and mansions
 - Have all amenities e.g. running water/ electricity
 - Landscaped gardens, swimming pools, golf course
 - High order retail
 - e.g. the Fashion Mall which houses over 150 stores
 - Have national and international designer shops
 - High order services
 - e.g. night clubs, and high quality restaurants.
- Rocinha is a hillside location
 - 100,000- 300,000 population with population density 48,000 per km²
 - Hillsides too steep for roads
 - Everything must be carried
 - Mountains around the city trap smog caused by exhaust fumes
 - Causing poor quality air
 - Frequent flash floods and mudslides
 - Organised crime = high levels of violence
 - Housing quality poor compared with Sao Conrado
 - High density but low rise
 - Made from concrete and brick with basic sanitation and electricity
 - Some businesses & services
 - e.g. banks, schools, shops and some health provision, with a lot of community support

Solutions to inequality

- Favela Bairro Project
 - A site + service scheme
 - Residents legally own land → more willing to improve their homes
 - Basic services provided e.g. electricity and water, rubbish collection, health care and schools.
- Self-help schemes
 - Government provides building materials and training
 - Wncourages the community to improve their own neighbourhoods
- Microfinance for people to learn new skills and start businesses
- Pacification
 - Elite government armed police units go into violent favelas to fight the drugs gangs
- Cable Cars
 - Built to make commuting easier because they cannot build roads on steep hillside in favelas
- Building new 'satellite cities'
 - Cities on the edge of Rio e.g. Barra de Tijuca is 20kms to the south
 - Homes in Barra de Tijuca are well-constructed and have electricity / running water
 - 'Gated communities' with security guards
 - Communal green space and leisure facilities

Traffic congestion

- Large population
 - Over 6 million people
 - + 1 million every 10 years
- High and increasing car ownership as Brazil's economy develops

- In 2020 80% households owned a car in Brazil
- Physical geography
 - Steep relief / surrounded by mountains
 - Difficult to build roads
- A large volume of traffic is forced along a few main roads
 - Causing severe congestion, accidents and noise and air pollution

Traffic congestion solutions

- The Maestro System
 - Managing Traffic in Real Time
 - A system of cameras + speed checks
 - Radio links sends traffic information to a control centre in real time
 - They can change traffic signals to help increase the traffic flow
- Investment in infrastructure
 - e.g. Yellow Line Expressway (motorway) and Elevado Dual Carriageway
- Improved public transport in Rio
 - 440 city bus lines transport over four million passengers each day
 - Cheap & with frequent services.
 - Metro
 - Three subway lines with 41 stations.
 - Light rail transport (LRT)
 - New tram system
 - Connects the port to the financial centre in the city and the international airport
 - 300,000 passengers each day
 - Bike Rio
 - A bicycle sharing scheme which started in 2011
 - There are 600 bicycles available at 60 rental stations throughout the city

Pollution

- Air pollution from:
 - Higher car ownership increases traffic congestion and vehicle emissions (CO, CO₂ + NO₂)
 - Power stations burn fossil fuels e.g. coal
 - Produce CO₂ (linked to global warming) + SO₂ (linked to acid rain).
 - Wealthier and growing population use more electricity
 - Factories emit various types of air pollution
- Water pollution from:
 - Industrial and domestic waste dumped in rivers
 - Increase in sewage flowing into rivers from large population
- Noise pollution from
 - Increased traffic
 - Construction
 - Late night services e.g. bars/ clubs
- Visual pollution from:
 - Unsightly (unattractive) derelict sites + construction sites
 - Graffiti + litter from growing population
 - Increased light pollution

Pollution solutions

- All solutions to traffic problem could reduce air pollution from traffic congestion
 - Particularly improving public transport and encouraging the use of bikes
- Reduce amount of electricity from burning coal
 - Use more renewable energy
 - Now 80% of electricity is from renewable, mostly hydroelectric power & some solar
- Improve sanitation system
 - Prevent sewage flowing into rivers
- CTR RIO
 - The main city landfill

- Opened in 2011 to solve waste problem
- It recycles rubbish but also produces recycled water and creates job opportunities for local poor people
- Nearby rubbish dumps which caused a lot of pollution have now been closed
- Laws to reduce emissions from factories and power stations
 - e.g. using scrubbers in the chimneys to absorb pollution
-

© Xingzhi Lu 2024

Shrewsbury urban area

2023年6月14日 19:22

Decline of CBD

- Closure of office space due to technological developments increasing work from home
- Inaccessible
 - Congestion during rush hour as workers commute by car
- Decline in the retail area of the CBD because shops cannot afford high rents and competition from online shopping
- Rural urban fringe more attractive
 - Retail & businesses have moved to cheaper land on rural urban fringe with space for expansion and car parks
 - Meole Brace retail park built on rural urban fringe to south of the town with supermarkets + chain stores
 - More accessible
- Vacant shops in CBD
 - 18% of shops are vacant
 - Shops close leaving empty shops & increased graffiti / vandalism
- CBD becomes deserted at night which makes it unsafe and higher crime rates

Decline of CBD solution

- Pedestrianisation
 - Pride Hill high street and market square are pedestrianized
 - With street furniture & pavement cafes
 - Improved built environment
- New development
 - Local government bought Pride Hill, Darwin & Riverside shopping centres in 2018
 - Now redeveloping area into ONE large building for retail and leisure
- Transport improvements
 - 3 park and rides e.g. Meole Brace
 - Reduce traffic in town
- Security
 - CCTV
 - Prevent theft

Urban sprawl evidence

- New developments on the rural-urban fringe of Shrewsbury include:
 - Retail park & Shrewsbury Town Football stadium built at Meole Brace
 - New road infrastructure e.g. A5 widened to provide ring road
 - Three park and ride bus services e.g. one at Meole Brace
 - New housing estates built along southern edge e.g. Bowbrook currently under construction next to new football stadium
 - Proposed North Shrewsbury Relief Road to link NE and SE areas of Shrewsbury and complete the ring road

Urban sprawl problems

- New development on the rural-urban fringe cause conflict with local people because:
 - Changing character of the surrounding villages as they become part of the city / town
 - Loss of valuable farmland + attractive scenery
 - Loss of natural habitats for wildlife + loss of biodiversity in the area
 - Increased noise and light pollution in the countryside
 - Construction sites / new housing
 - Increased flood risk with impermeable surface

Plate tectonics

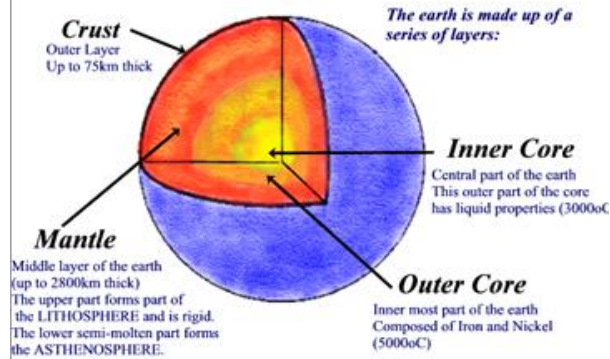
2022年11月2日 23:40

Keywords

- <https://quizlet.com/cn/742119072/flash-cards/>

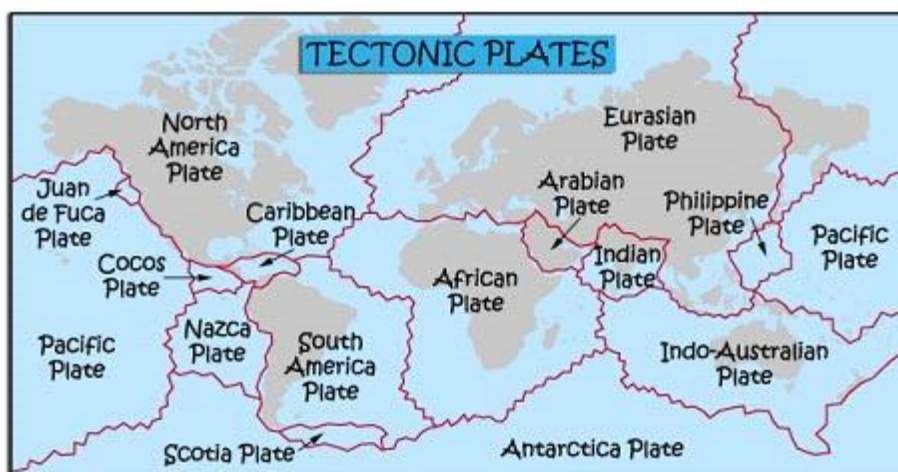
Structure of the Earth

Structure of the Earth



- Crust
 - Solid rock, thin
 - Oceanic crust: made of basalt, very young, thinner (5-10km), denser
 - Continental crust: made of granite, older, thicker (up to 70km), less dense
- Mantle
 - Very thick - 2900 km
 - Molten rock - 1000°C magma
- Core
 - Made of metals such as iron /nickel
 - Extremely hot (5000°C)

Theory of plate tectonics

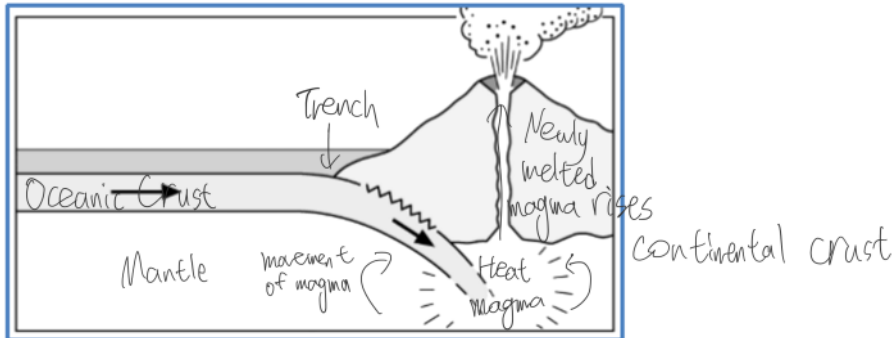


revisionworld

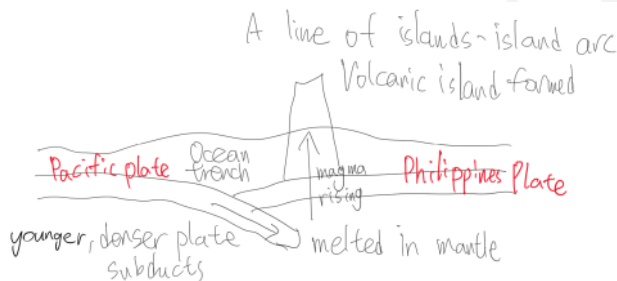
- 7 major plates and other smaller plates
- Convection currents
 - In the mantle
 - The heat from the radioactive materials in the core (5,000°C) heating up the magma in the lower mantle
 - The hot magma is less dense + rises where it cools and then sinks causing a circular movement of magma within the mantle.
 - Causes the plate to move slowly

Plate boundaries

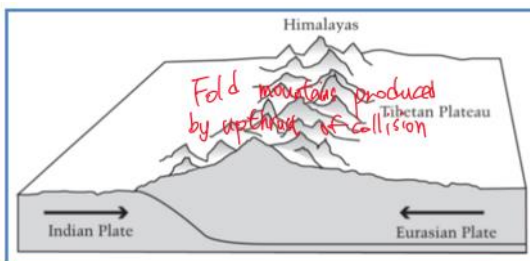
- Destructive (convergent) - O+C
 - Heavier oceanic crust moves towards lighter continental crust
 - The denser oceanic crust subducts under the lighter continental crust at the subduction zone
 - The oceanic crust melts to form magma due to heat and friction in mantle
 - The newly formed magma is less dense than magma in the mantle and rises to the surface in cracks in the continental crust
 - Lava solidifies to form volcanoes
 - The continental crust crumples to form fold mountains
 - A deep ocean trench forms where the two plates meet
 - Both volcanoes and earthquakes happen on these boundaries and they are powerful
 - The earthquakes focus are located where the two plates meet and have any focus depth



- Destructive - O+O
 - Similar to O+C
 - No fold mountains since there is no continental crust
 - Island arc formed in the mid ocean

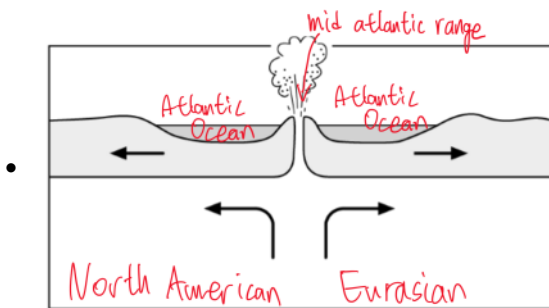


- Collision
 - Two continental plates move towards each other
 - The continental plates fold/crumple upwards to form fold mountains e.g. Himalayas
 - There are powerful earthquakes
 - There are no volcanoes because there is no rising magma.



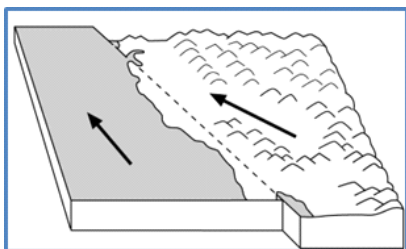
- Constructive (divergent)
 - Two plates move away from each other
 - A gap appears between the plates which fills with magma from the mantle
 - The magma solidifies to form volcanoes (new crust)
 - Under the ocean: mid ocean ridge
 - Land: rift valley e.g. Great African Rift Valley
 - Gentle volcanoes and earthquakes form on these boundaries





- ### Conservative

- Two plates slide past each other
 - The plates become locked together due to friction and pressure builds up
 - When the pressure is too strong, the plates tear apart along a fault line e.g. San Andreas Fault
 - The pressure is released as seismic energy and produces powerful earthquakes
 - There are no volcanoes because there is no rising magma
 - North American + Caribbean



Fold mountains

- Destructive / collision plate boundary
 - Needs a continental plate
 - The sedimentary rocks that have built up on the plate are forced upward and folded/crumpled to form fold mountains.

Distribution

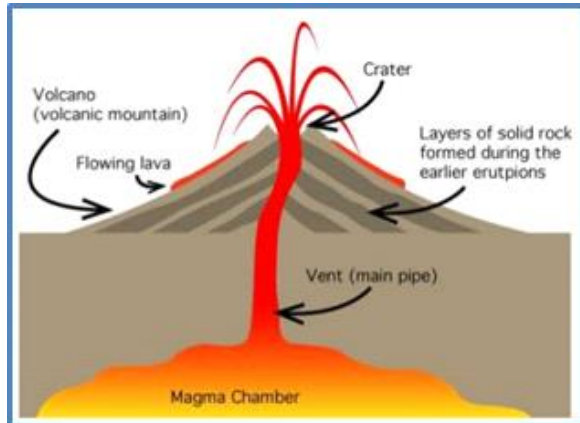
- Fold mountains
 - Unevenly
 - Along plate boundaries with a continental crust
 - Found at destructive plate and collision plate boundaries
 - Northeast Siberia - not along the plate boundaries
 - Volcanoes
 - Unevenly
 - In narrow bands, on plate boundaries (except collision / conservative)
 - Mostly around Pacific Ring of Fire on the boundary of the Pacific Plate
 - Along constructive plate boundaries e.g. mid Atlantic Ridge
 - At hot spots in the centre of plates e.g. Hawaii
 - Earthquakes
 - Unevenly
 - In narrow bands, on all types of plate boundaries
 - Around Pacific Ring of Fire on the boundary of the Pacific Plate
 - In similar pattern to volcanoes
 - Exception: China (not along plate boundaries)

Volcanoes

2022年11月3日 8:52

Keywords

- <https://quizlet.com/cn/742120325/flash-cards/>



Formations at hotspots

- The magma comes directly from the mantle
- There is a hot rising plume of magma in the mantle and the oceanic crust is thin
- The magma can force its way to the surface and form volcanoes e.g. Hawaiian Islands

Secondary cones / Parasitic cones

- In stratovolcanoes
- These are created when the main vent is blocked by solidified magma.
- The molten magma finds another line of weakness to the surface on the sides of the main volcano.
- The lava solidifies on the surface forming a small cone

Hazards

- **lava flows**: fast flowing rivers of molten rock which flow down volcano sides
- **ash clouds**: ash is **ejected up** into the atmosphere and then deposited in layers around the volcano. It covers + kills crops and sometimes it is so deep it buries buildings or the weight of ash collapses them
- **volcanic bombs**: partly solidified blocks of lava which are ejected from the crater + fall on the volcano sides
- **lahars**: melted snow from top of high volcanoes mix with ash + run down the volcano sides as fast flowing mudflows
- **pyroclastic flows**: clouds of extremely hot, poisonous gases mixed with ash **flow down** the volcano sides at speed up to 200km per hour
- **tsunamis**: when a volcano side collapses into the sea during an eruption, sea water is displaced and forms large waves called tsunamis

Types of volcanoes

- Stratovolcano
 - Destructive plate boundaries
 - Steeper slopes and narrower base
 - Viscous lava not flowing far from the vent
 - Solidifies quickly, forming layers of ash and lava
 - Thicker lava because it is cooler and is from melted plate
 - Magma can solidify in the vent and the volcano becomes dormant
 - More explosive eruptions but less frequently
 - Secondary / parasitic cones
 - Plates may be stuck: no eruption because no melted plate
- Shield volcano

- Large, wider volcanoes / formed by lava only
- Gentler slopes
- Runny lava flows down the slope, away from the summit vent before it solidifies slowly
- Runny lava because it is hot magma from the mantle
- Constructive plate boundaries or hot spots
- More frequent eruptions - plates moving away, lava coming out frequently

States of volcanoes

- Active volcano: has recently erupted + likely to erupt again
- Dormant volcano: hasn't erupted for over 100 years
- Extinct volcano: has finished erupting + the magma chamber has cooled down, hasn't erupted for 2000 years

Eruptions

- The magma chamber fills up with magma
- Heat and pressure build up
- Magma is released and flows out of the volcano in lava

Impacts

- People evacuated
 - People displaced because homes destroyed
- Land covered in ash which destroys crops
 - Food insecurity
 - Deaths from food shortage
- Contaminated water supplies by ash or pipes destroyed by lava/pyroclastic flows
 - Deaths from unclean water
 - Diseases spread
- Deaths & injuries from volcanic ejecta
- Buildings destroyed and roads blocked by ash & pyroclastic flow
 - Loss of earnings because business closed
 - High cost to rebuild homes, schools, businesses & clear road
 - Emergency aid workers cannot access
- Ash cloud blocks out the sunlight + causes darkness
 - Air space to be closed because jet airplanes cannot fly through the ash safely
 - Disrupts plant photosynthesis

Reasons for not leaving

- The layer of ash from the eruption can fertilise the soil
 - The lower slopes of the volcano can be used for intensive farming
 - High crop yields
- Cheap and clean geothermal energy
- Mining sulphur, diamonds and golds
- Tourism jobs e.g. as guides or working in hotels.
- Scientific study: scientists studying plate tectonics and developing prediction methods locate near active volcanoes
- No choice or because of family traditions
 - Their families have lived there for generations
 - They want to live near their family
 - Can only make livings in the area
 - e.g. on their family farm
 - They can not afford to move

Reducing Impacts

- Predicting eruptions
 - Seismometers: measure increasing number of earthquakes caused by the magma pushing up under the volcano
 - Tilt meters: measure change in the volcano's shape as the magma causes the surface to bulge

- outwards
- Thermometers: measure the increase in ground temperature as the magma moves towards the surface
- Gas sensors: measure the increase in release of gases from the volcano
- Houses + schools/hospitals are built avoiding areas at risk from the eruption using risk maps
- Emergency services are trained
 - Using planned evacuation routes
 - Setting up evacuation
 - Emergency medical camps
- People are educated
 - How to evacuate safely
 - Leaving for temporary shelters
 - How to make an emergency survival kit
- Houses built to resist ash deposit
- Cool lava using sea water

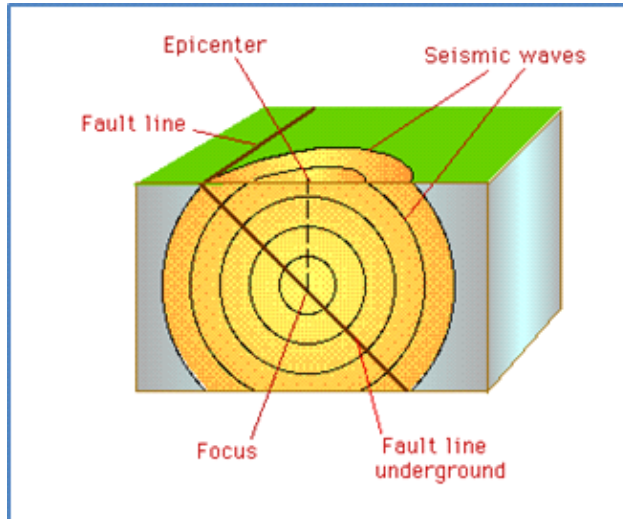
© Xingzhi Lu 2024

Earthquakes

2022年11月3日 18:50

Keywords

- <https://quizlet.com/cn/742119831/flash-cards/>



Causes

- Destructive: pressure builds up when one plate gets stuck as it subducts down into the mantle
- Constructive: pressure builds up along cracks within the plates as they move apart
- Conservative: pressure builds up when the plates are moving past each other + get stuck
- When the plates eventually move, there is a sudden release of pressure
- Seismic energy is released, causing seismic waves to travel through the crust to the surface → ground shaking

Earthquake scales

- Moment magnitude scale & Richter scale
 - Logarithmic - 10 times greater than the value below
 - Measure seismic energy carried by seismic wave
 - Magnitude is measured using a seismometer
- Mercalli Scale
 - This measures the impacts of an earthquake.
 - These are measured by asking eye witnesses for observation of what happened
 - The scale is from 1-12

Hazards

Landslides	Earth shakes steep slopes causing loose rocks to slide down the slopes
Tsunamis	Some earthquakes take place under the ocean. The shockwaves cause the ocean floor to rise, displacing water above, causing waves
Ground shaking	Seismic energy released sending seismic waves through the crust
Buildings collapse	Strength of buildings weakened by the earth shaking
Fires	Electricity wires are broken and cause sparks
Liquefaction	Saturated soil temporarily loses its strength and behaves like a liquid

Impacts

- Buildings + bridges collapse

- People left homeless
- Business destroyed causing unemployment
- High cost to repair
- Loss of life: people are killed + injured by collapsing buildings + bridges
- Transport links e.g. roads, railways are blocked by collapsed buildings
 - Aid workers cannot get through
 - High cost to repair
 - Economic loss due to loss of days of work
- Electricity lines + gas pipes are damaged so there is no electricity or gas supply
- Underground water + sewage pipes are broken causing loss of clean water supply + contaminated water
 - Diseases spread

Physical factors

- Magnitude of the earthquake
 - Higher magnitude earthquakes will cause more damage because there is greater ground shaking
- Depth of the focus
 - Deep focus earthquakes will cause less ground shaking at the surface
 - Much of the energy is absorbed by the crust as the seismic waves pass through it
 - Shallow focus earthquakes have more energy at the surface = more ground shaking
- Distance from the epicentre
 - As the shock waves spread away from the epicentre they become weaker
 - The strongest ground shake is found at the epicentre
- Geology / rock type
 - Loose sedimentary rocks may experience liquefaction and cause buildings to sink
 - Buildings on solid rock are less likely to be damaged.
- Time of day / year
 - Earthquakes which occur at night often have greater death rates
 - People are asleep indoors and at risk from building collapse
 - More difficult to rescue
 - Earthquakes in winter time have more secondary deaths
 - People may die from exposure/cold when they are made homeless

Human factors

- Population density
 - There is likely to be higher deaths + injuries in densely populated urban areas
- Building construction + design
 - Poorly constructed buildings are more likely to collapse
 - In MEDCs buildings are earthquake resistant and designed to move with the ground shake without collapsing.
- Community preparedness
 - In areas which are developed and earthquakes are frequent, the government, emergency services and people have planned for earthquakes

Reducing impacts

- Impossible to predict the exact time
- Buildings techniques
 - Reinforced foundations deep in the ground to increase building stability
 - Rubber shock absorbers between the foundations and the building structure to reduce building movement
 - Reinforced steel frames and reinforced corners of buildings to increase building strength
 - Counterweights to reduce the building sway during the earthquake
 - Automatic shutters to come down over windows and prevent the glass breaking and injuring people
 - Pyramid shaped buildings to reduce the weight of the top of the building and make the building more stable

- Open areas around the buildings for safe evacuation
- Educate people for being prepared for earthquakes
- Train the emergency services
- Land use planning
 - Solid rock experiences less shaking than loose sedimentary rocks
 - Flexible gas, water and power lines can be used to reduce chances of them breaking when the ground moves
- Aids
 - Emergency aid
 - Provide search + rescue from collapsed buildings, temporary shelter, food and clean water
 - Reduce the number of secondary deaths.
 - Long term aid
 - Provide the money to rebuild homes and services e.g. schools and hospitals

LEDCs & MEDCs

- (In LEDCs)
- Buildings are poorer quality
 - The government and people do not have enough money to build earthquake resistant buildings
 - Many people live in shanty towns in poor quality buildings on steep slopes which are vulnerable to landslides
- Emergency services not as well trained
 - Government does not have the money to train fully the emergency services
- Transport infrastructure is worse
 - It is more difficult for emergency services to reach the injured people
- Health care services are worse
 - Fewer doctors + nurses
 - More people die from treatable injuries

Mount Sinabung Case Study

2022年11月15日 20:07

Basic information

- Located in North Sumatra of Indonesia
- On the Pacific Ring of Fire
- Kept dormant for 400 years
- It first erupted in late August 2010, and then in September 2013.
- The major eruption broke out in February 2014, and has kept erupting
 - 16 people were killed

Explanation

- Destructive plate boundaries
- Indo - Australian plate meets with the Eurasian plate
- The denser Indo-Australian plate (oceanic plate) is forced to subduct under the Eurasian plate (continental plate)
- The subducting plate melts in the mantle
- Newly melted magma rises up to the surface through cracks in the Eurasian plate because it is less dense than existing magma in the mantle
- Volcanic eruptions occur, lava and ash cools to form a new layer of the stratovolcano

Materials Erupted

- Volcanic ash
 - Ash clouds reaching over 5000 metres high
 - Engulfing nearby villages, damaging property and crops and poisoning animals
 - Trees toppled and scorched
 - Unable to see clearly
- Lahars
 - Carrying rocks thrown down by the mountain down river valleys
 - Bridge destroyed, surroundings covered in mud
- Pyroclastic flows
 - Moved up to 5.4 km
- Lava flow down the southeast slope
- Poisonous gases
 - Carbon dioxide and sulphur dioxide released

Impacts to the environment

- Lava flow in river
 - Contaminated local water resources
- Ash plumes
 - Air pollution as it lingers in the air
 - Blocked the sun and disrupts natural vegetation from photosynthesis
- Wildlife killed by the ash and pyroclastic material and lost their habitat
- Ash deposit
 - Covered the land creating new layer of ash and lava
- Natural forests destroyed by pyroclastic flows

Impacts to people

- 16 killed and hundreds injured
- Respiratory problem from ash in air
- Buildings destroyed by the weight of the volcanic ash
- Surrounding villages were abandoned
 - Thousands evacuated and 30,000 displaced
 - Vast numbers of people took refuge in temporary camps and shelters

- Crop destroyed by ash, resulting in poor harvest
 - 8000 hectares farmland destroyed, causing €8 billion of crops lost
- Infrastructure destroyed e.g. sewage pipes destroyed
- Water supplies contaminated by ash
- Road blocked restricting access for aid

Short-term effects

- The volcanic ash produced as a result of the eruption caused damage to many villages.
- Many houses were destroyed as they collapsed under the weight of the ash.
- Ash plumes caused air pollution.
- Thousands of people were evacuated to temporary camps and shelters.
- There was a shortage of clean water for people.

Long-term effects

- 16 people died
- Ash produced by the volcano caused long term health issues and many local people experienced respiratory problems.
- Ash began to blanket villages and cities in North Sumatra e.g. Medan
- Many farmers lost their crops causing many areas surrounding the volcano to experience food shortages and increased food prices.
- The crop damage also caused long term economic loss to the region
- Long term environmental damage caused by valleys being filled with pyroclastic material and some wildlife was poisoned by the toxic gases
- Government is now helping people with the long term economic costs of rebuilding homes and replanting agriculture

Reasons for not leaving

- Job opportunities
 - Becoming a local guide for tourists, hospitality provide good source of income
- Finding volcanic ash useful for fertile soil
 - Increased crop yields for food for locals and coffee and tropical fruit for export
 - Ideal climate for growing crops with hot and wet equatorial climate
- Scientists monitoring volcano and researching to develop greater understanding of volcanic activity to improve prediction techniques
- Mining sulphur in the area
- Unable to leave
 - Cannot afford to leave
 - Their farm, plantation, etc. is located here (cannot make living elsewhere)
- Don't believe in the scientists or the government
 - Thinking that the volcano won't erupt in a long time

Haiti Case Study

2022年11月21日 18:40

Basic information

- 12th January 2010
- Richter scale magnitude 7
- About 17:00 in the afternoon
- Epicentre 24 km SW of Port au Prince
- Shallow focus of 10km below ground

Plate boundary

- Conservative plate boundary
 - North American plate moving west and Caribbean plate moving east
 - Plates moving in opposite directions
 - Sliding past each other
- Plates are stuck due to friction and are jammed together for over 250 years since last earthquake in 1750s
- Pressure build up between the plates
- When the plates are eventually able to move there is a sudden release of pressure
- Pressure is released as seismic energy
- Seismic waves travel to the surface, causing earthquake
- Plates moved 2m

Hazards

- Primary hazard:
 - Ground shaking for 50 seconds during main quake
 - Strong aftershocks of magnitude 6 up to a week later

Social impacts

- 230,000 people killed
- 50% of buildings in Port au Prince collapsed or damaged, 180,000 homes damaged due to poorly built concrete construction
- 1.5 million people displaced
 - Stayed in temporary refugee camps
 - Still 1 million living in these camps after 1 year
- Public infrastructure destroyed or damaged
 - Hospitals destroyed leaving insufficient medical provision
- 1300 schools damaged or destroyed
- Cholera came to Haiti with aid workers
 - 4,000 people died of cholera in the camps in November 2010

Economic impacts

- Port and airport became unusable
 - Aid cannot enter
- Roads blocked by piles of rubble and become unusable
- High cost to rebuild public services

Political impacts

- Government buildings collapsed and hundreds of government officials died
 - Difficult to manage the rescue and the recovery
- Haitian Government and international aid agencies criticised for poor management of the recovery

Hydrological characteristics + processes

2023年1月30日 17:03

Keywords

- Hydrology: <https://quizlet.com/cn/769956187/flash-cards/>
- Water cycle / hydrological cycle: <https://quizlet.com/cn/769960409/flash-cards/>
- River: <https://quizlet.com/cn/769960839/flash-cards/>

Three states of water in the cycle

- Ice
- Liquid water
- Water vapour

Types of precipitation

- Rain
- Snow
- Sleet
- Hail

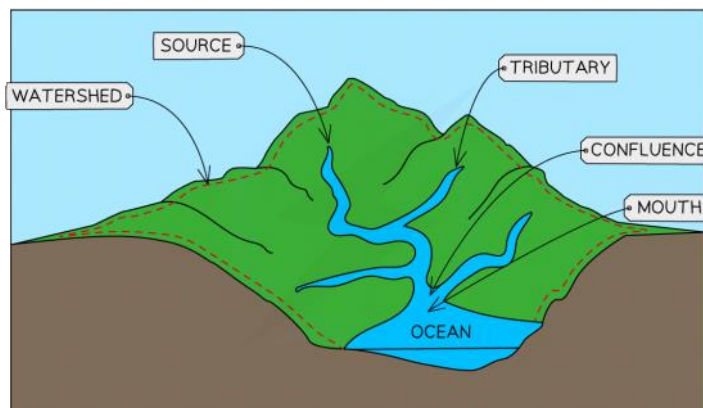
Fog and mist

- Fog
 - Denser, less visibility
- Mist
 - See through, quite thin
- Formed when water vapour is condensed at ground level

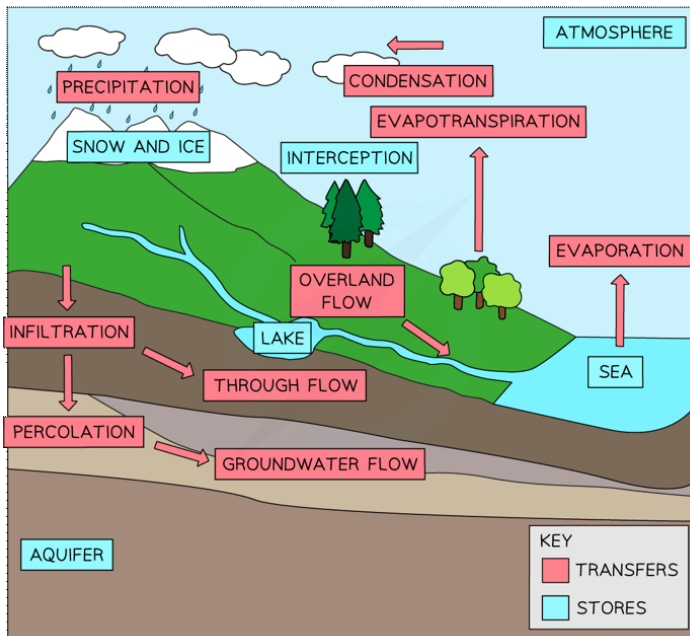
Clouds

- 3 types of clouds
 - Cirrus clouds
 - High altitude, thin clouds
 - Like horsetail
 - Cumulus
 - White, fluffy clouds
 - Look like cauliflower
 - Stratus
 - Form in layers
 - Cause rain when they are grey
- Alto: high up
- Nimbo / nimbus: grey and black, causes rain

Drainage basin



Hydrological cycle flows



Upper course

- Characteristics
 - Valley
 - Steep sided
 - Narrow
 - V shaped
 - Vegetation
 - Grassland
 - River channel
 - Steep gradient
 - Narrow and shallow
 - Flowing straight and down the slope
 - Low flow
 - Few tributaries have added water to the main river
 - Large and angular bedload
 - Low velocity
 - High friction
 - Low flow
 - Low discharge
 - Small cross section (low flow)
 - Low velocity
- Processes
 - Vertical erosion is the dominant process
 - Traction and saltation is the main transportation type

Middle course

- Characteristics
 - Valley
 - Gentle slope on sides
 - Wide
 - Vegetation
 - Farmland
 - River channel
 - Gentle gradient
 - Wide and deep

- Meandering and downslope flow
 - Smaller and rounder load due to attrition
- Processes
 - Vertical erosion decreasing in importance
 - More lateral erosion and deposition
 - Suspension is the main transportation type

Lower course

- Characteristics
 - Valley
 - Very gentle slopes on sides
 - Very wide
 - Vegetation
 - Farmland
 - River channel
 - Almost flat
 - Widest and deepest
 - Meandering and downslope flow
 - High flow
 - Many tributaries have added water to the main river
 - Bedload is small and rounded due to attrition
 - Fastest velocity
 - Less friction with the smooth and deep river channel
 - High flow
- Processes
 - Deposition is more important than erosion
 - Fine material deposited
 - Lateral erosion because the river is cutting sideways

© Xingzhi Lu 2024

River processes

2023年1月30日 17:03

Keywords

- <https://quizlet.com/cn/769205279/flash-cards/>

Erosion processes

- Hydraulic action
 - Power of fast flowing water breaks up the rock and removes pieces
 - Water flows into cracks in the rock and compresses the air
 - When water flows out the air expands rapidly, it implodes and over time breaks up the rock
- Abrasion
 - Sand and stones carried by the river water are thrown at the river bank or bed
 - They weaken the rock, causing pieces to be removed
- Solution
 - Some rock types dissolves in water e.g. limestone and chalk
 - Some rock types does not dissolve e.g. granite and basalt
- Attrition
 - The load carried by the river smashed together and become smaller and rounder
 - (Not eroding the river bank and bed)

Factors affecting rate of erosion

- High velocity
 - More load carried in the water
 - More abrasion
 - Faster flow
 - More hydraulic action and solution
- Resistant rock
 - e.g. granite / basalt
 - Formed by solidified lava
 - No pores - no hydraulic action
 - Not dissolving in the water - no solution
 - Harder
- Less resistant rock
 - e.g. limestone / clark
 - Have pores
 - Dissolves in the water
 - Softer

Transportation process

- Traction
 - Larger and heavier particles are rolled along the river bed
 - Boulders and cobbles
- Saltation
 - Lighter particles are bounced along the river bed
 - Pebbles and gravel
- Suspension
 - The smallest and lightest particles are carried by the water
 - Make the water muddy or cloudy
 - Sand and silt
- Solution
 - Particles which have been dissolved are carried as a solution in the water
 - Cannot see the particles
 - Mostly happens in areas of limestone or chalk

- Clay
- There is more load carried downstream
 - More velocity = more energy = more load

Load particle sizes

- Heavy
 - Boulders > cobbles
 - Hard to pick up
- Medium sized
 - Pebbles > gravel > sand
 - Sand is the easiest to pick up because it has light individual pieces
- Smallest / finest size
 - Silt > clay
 - Clay is the easiest to transport
 - Stick together so heavier than sand, harder to pick up

Reasons for deposition

- Losing energy because the river slows down
 - Gradient decreases
 - Meets a large body of water
 - River floods covers the flood plain during a flood so the water is shallower
 - More friction
 - River is returning to normal flow after a heavy storm

Sequential deposition

- The load is deposited in order of its size with the largest particles first
- Clay is not deposited
 - It is too light

Deposition at mouth

- Most deposition is done at the mouth
 - Carries most load at the mouth
 - Loses energy when meeting the sea
- Flocculation
 - The salt causes the clay particles to stick together when the river meets the sea and is in contact with salt water
 - Clay particles become heavier so they are then deposited

Discharge

- Discharge = width × depth × speed (m³/s)
- Higher downstream
 - Greater depth
 - Greater width
 - Highest speed

River landforms

2023年1月31日 20:02

Keywords

- <https://quizlet.com/cn/769952217/flash-cards/>

Positions

- Upper course
 - Interlocking spurs
 - Potholes
 - Rapids
 - Waterfalls
 - Gorges
 - V-shaped valley
- Middle or lower course
 - Meanders
 - Oxbow lakes
 - Braided channels
 - Levees and floodplains
- Mouth of the river
 - Deltas
 - Estuaries

Interlocking spurs formation

- Caused by the river winding round pieces of harder rock
- The low discharge and slow velocity of the water does not have enough energy to erode through them

V shaped valley formation

- The river bed is more prone to erosion
- The river eroded downwards
- Sides of the river channel are weakened and become prone to collapse
- The sides collapse and create the V shape

Rapids formation

- Slightly steeper gradient in the river
- The river bed is rocky and uneven so it causes rough white water (turbulent water)

Waterfall formation

- Horizontal layer of more resistant rock above a layer of less resistant rock
- Soft rock is eroded faster by hydraulic action, creating an undercutting beneath the hard rock
- Overhanging rock layer collapses because there is no support underneath and becomes fallen rock
- Abrasion from the fallen rocks and hydraulic action erode vertically to create a plunge pool
- Waterfall retreats upstream, leaving a steep-sided gorge

Potholes formation

- Smooth, rounded holes in the bedrock of the river bed
- About 30cm across
- Stones are trapped in currents in the water
- Erode small holes in the river bed by abrasion
- The stones get trapped in the holes
- Turbulent flow of water swirl them around in the hole
- They continue eroding the hole, making them deeper and larger

Meanders formation

- Water in a river flows in a corkscrew pattern called helical flow
- Faster flow in the outside of the flow
 - Thalweg is found close to the outside bank
 - Outside bank being undercut by lateral erosion such as abrasion and hydraulic action
 - Forms a steep river cliff and deepens the channel on the outside of the bend
- Slower flow in the inner bank due to the friction when moving inside
 - Deposits sediment such as sand and shingle on the slip off slope
 - Form point bar
- The cross section of the channel is asymmetrical
 - Shallower on the inside and deeper on the outside

Oxbow lakes formation

- Meanders migrate towards each other due to erosion on outside of bends
- Neck between the meanders is eroded and become very narrow
- New straighter and more efficient channel formed during a flood
- Deposition of sediment due to lack of energy
 - Water now takes the quickest route
 - In slow flowing old channel and where it attempts to re-join straighter channel
 - Blocks the end of the meander and separates it from the river
- Leaves an oxbow lake with stagnant water
 - Eventually dry up and leave a meander scar

Floodplain and levees formation

- Erosion
 - The fastest flow erodes the outer bank and slightly downstream bank
 - Meanders migrate downstream creating flat valley
 - Floodplain is created
- Deposition
 - When the river floods and covers the floodplain, the water loses speed because of the increased friction with the ground and shallow water
 - The river loses energy and deposits the load it is transporting
 - The largest, heaviest material like pebbles and gravels are deposited first
 - They build up the river banks forming levees
 - The smaller lighter material like silt is deposited further away from the river to form the floodplain
 - The deposited material is called alluvium and forms fertile soil

Deltas formation

- The river carries a lot of load because it had been flowing over a long distance
 - Lots of load from erosion upstream
 - High discharge in lower course so lots of load can be carried
- It slows down when it hits the sea and loses energy so lots of load is deposited
- The sediment is not removed by the sea because it has a coastline with low energy waves
- The river channel divides into many distributaries
 - The river deposit its load in the centre of the channel
 - Water are forced to flow sideways
- The river deposits its load sequentially with the largest particles first (gravel → sand → silt)
- Flocculation
 - The salt causes particles of clay to clump together so they become heavier and deposit
- Shapes
 - Arcuate: triangular e.g. Nile Delta
 - Bird's foot: look like fingers of deposition growing out into the sea e.g. Mississippi delta

Estuaries

- Occurs when the mouth of the river is tidal
 - The water changes height from low tide to high tide every 12 hours

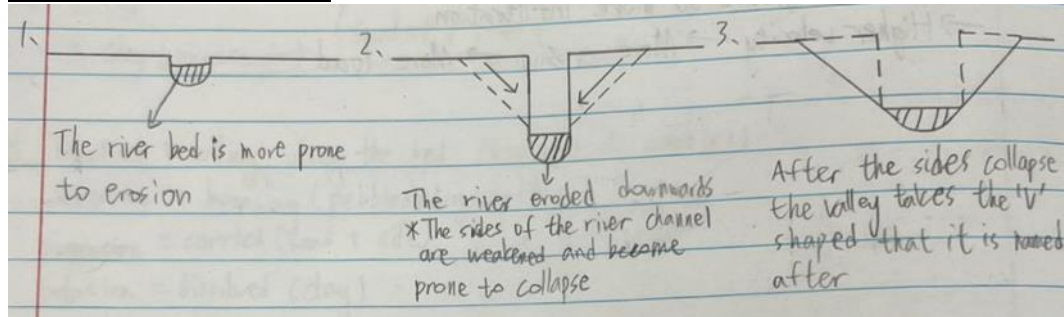
- The water in the river mouth is salty because it is a mixture of river and sea water
- The river loses energy when it flows into the sea and deposits sediments to form mudflats
- Sometimes the mud is colonised by vegetation which can survive in the salty environment and forms salt marshes
 - These plant can survive even when the water covers them at high tide

© Xingzhi Lu 2024

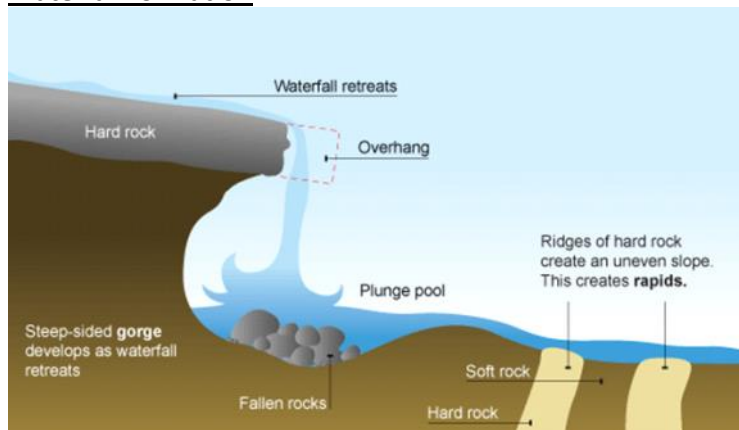
River landforms diagrams

2023年3月20日 19:09

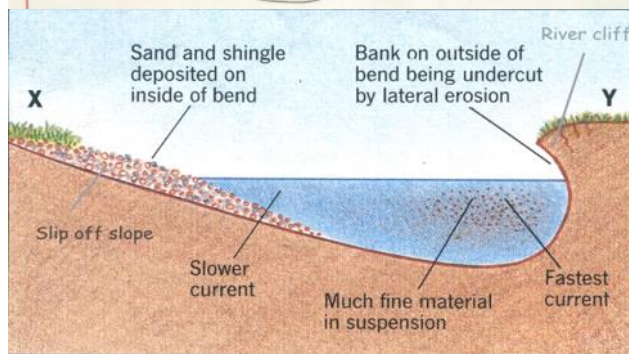
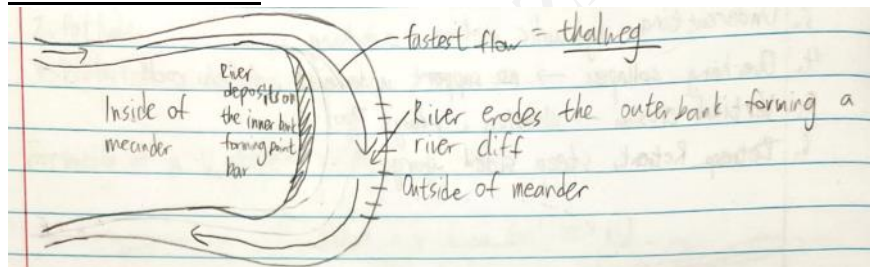
V-shaped valley formation



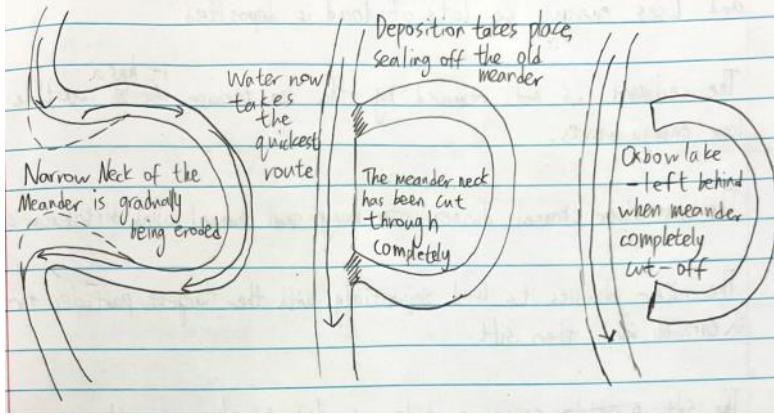
Waterfall formation



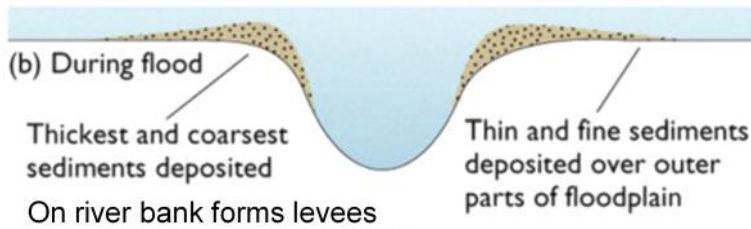
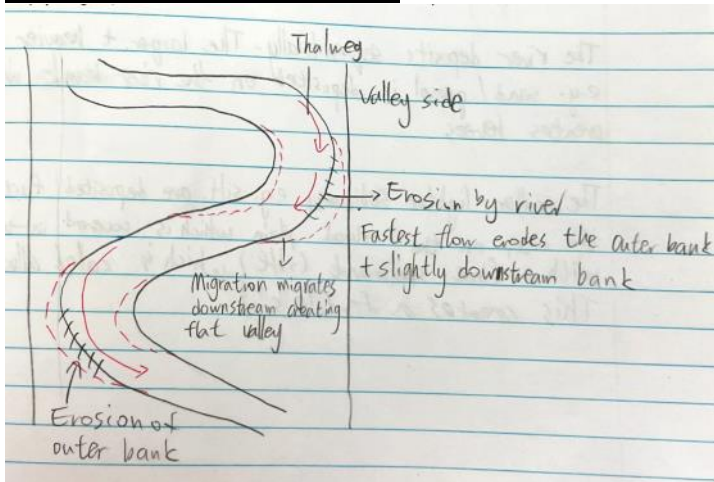
Meanders formation



Oxbow lakes

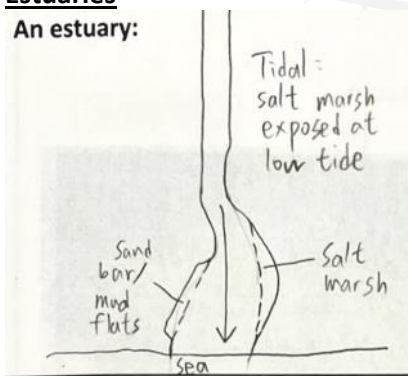


Floodplain and levees formation



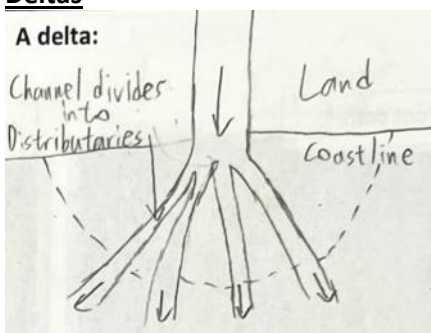
Estuaries

An estuary:



Deltas

A delta:



Opportunities and hazards of rivers

2023年1月30日 17:03

Keywords

- <https://quizlet.com/cn/782365379/flash-cards/?new>

Opportunities

- Flat land
 - The floodplain is a large area of flat land
 - Easier to build houses and factories
- Fertile soils
 - When rivers flood the sediment they deposit is called alluvium
 - Creates fertile soils so there is high crop yield
- Water supply
 - River water is fresh and can be used for irrigating crops
 - More food can be grown even in areas where there is low rainfall
 - The water can also be used for domestic use and in factories for cooling or cleaning machines
- Transport
 - Large rivers can be used as transport routes for shipping goods from inland areas to the sea port
- Fishing
 - Fish are an important source of protein
- Hydroelectric power
 - Rivers can be dammed and the power of the river used to turn turbines
 - Create a cheap, clean source of electricity

River flooding

- When the water in their channel reaches the top of the banks which is called bankfull discharge
- Then the river water overflows the banks and covers the floodplain

Causes of river flooding

- Physical causes
 - (short lag time)
 - Short period of heavy rainfall
 - The water cannot infiltrate fast enough into the ground because the ground is saturated
 - The water quickly reaches the river as surface runoff so there is a short lag time
 - The river cannot transport it away quickly enough
 - Long period of rainfall
 - The soil and rock are saturated
 - Any further rainfall cannot infiltrate into the soil and so runs off quickly to the river so short lag time
 - River cannot transport water away fast enough
 - Snowmelt in spring
 - Snow melts quickly and lots of water reach the channel quickly
 - Impermeable rock (geology)
 - Rainwater will not percolate into the ground but will reach the river quickly by surface runoff
 - Steep relief
 - Gravity will cause rainwater to run off quickly to the river because water does not have time to infiltrate
 - Small drainage basin
 - Water will enter the river quickly
 - Short lag time
- Human activity

- Agriculture
 - Soil is left unused and exposed to the elements
 - Water takes less time to reach the river by surface runoff because exposed land discourages infiltration
- Deforestation
 - Less vegetation so less interception
 - Ground become saturated faster
 - More surface runoff, water reach river quickly
- Urbanisation
 - Lots of impermeable soil
 - Water reach river quickly by surface runoff
- Climate change
 - Global warming is increasing the number of extreme storms and heavy rainfall events
 - The glaciers which are the source of many rivers are melting faster so increasing the amount of water in rivers

Cause of flashy hydrographs

- = Short lag time
- Heavy, intense rainfall
- Steep relief (steep slopes)
- Ground is already saturated so rainwater cannot infiltrate
- Impermeable rock so the water cannot percolate
- Lack of vegetation so less water is intercepted
- Urbanisation so ground surface is impermeable concrete

Impacts of flooding

- Social
 - Deaths and injuries
 - Homes destroyed so people displaced
 - Schools destroyed so loss of education
 - Water contaminated causing water borne diseases e.g. cholera
 - Power lines destroyed so electricity is cut
- Economic
 - Roads flooded so limited access to businesses
 - Factories / shops flooded so loss of days working
 - High cost to rebuild them
- Environmental
 - Destruction of natural habitats
 - Animals (wild) killed or injured
- Benefits (all 3 categories)
 - Fertile soil from alluvium deposition
 - High crop yield
 - Ground water supplier refilled
 - More water for plant / animal / factories / drinking / domestic use

Management of river flooding

2023年1月30日 17:03

Method to control the flood

- Artificial levees
 - Builds up the banks of the river to increase the size of the river channel cross section
 - More water can be stored in the channel and stops flooding happening as quickly
 - Usually made of concrete so they are strong, but in LEDC often made of earth or mud
- Land use planning
 - Important buildings such as hospitals and schools are built far from the river
 - Floodplains are used for recreational use e.g. parks and golf courses
- Afforestation
 - Increase interception
 - Some of the water returns to the atmosphere through evapotranspiration
 - More unlikely and slower to become saturated
 - Less water reach the river and reach more slowly
- Dredging the channel
 - Remove sediments from the river bed
 - Makes the river deeper so its channel can hold more water
- Straightening the channel
 - Remove meanders and make the river run straighter
 - Shortens the river so that the river flows faster and water is removed from the area faster
 - May cause more flooding downstream
- Bridge design
 - Build bridges that are slim and streamlined
 - Allowing water to pass through the area of river more quickly
- Dams and reservoirs
 - Build a dam to store water in a reservoir
 - Water is the released steadily
- Creating natural areas
 - e.g. wetlands
 - Soak up some of the flood water
- Overflow channels or spillways
 - Extra river channels or spare land near the river
 - Extra water can be diverted and stored there during a flood

Preparing the population

- Flood warning systems
 - Gives people time to prepare and evacuate
- Education & awareness
 - People know what to do during a flood
- Train emergency services
 - To respond effectively to rescue people
- Flood shelters
 - Safe, dry place for people to stay
- Emergency aid
 - Help in the form of food, water, shelter

Bangladesh flooding

2023年3月10日 0:54

Basic info

- LEDC
- One of the poorest countries in Asia
- Having a drainage basin that covers over 1 million km²
- Most of the land is a delta from two main rivers: Ganges and Brahmaputra

Causes of flooding in Bangladesh

- Physical
 - Many large rivers including Ganges + Brahmaputra flow through Bangladesh with high discharges
 - Low lying flat land
 - It is formed of large, flat flood plains and delta created by these large rivers
 - 25% of Bangladesh is less than 1 m altitude
 - Snowmelt from the Himalayas takes place in late spring & summer, heavy monsoon rains happen at the same time
 - The rivers have a high peak discharge
 - Tropical storms/ cyclones bring heavy rains and coastal flooding
- Human
 - Deforestation of the Himalaya
 - Reducing interception rates which increases run off to the rivers
 - Short lag time
 - Urbanisation on the flood plain e.g. in Dhaka
 - Increased amount of run off to the rivers
 - Urbanisation has reduced the lag time and peak flow has greatly increased so flooding is more frequent
 - Climate change / global warming
 - Increased snow melt in the Himalaya, increase peak discharge
 - Increased number of cyclone storms in the region
 - Poorly maintained flood defences
 - e.g. artificial levees collapse in times of high river discharge

Impacts of flooding in Bangladesh

- In 2007 flood
- Over 1,100 people killed
- Many deaths caused by drowning, landslides and snakebites
- 2 million acres of agricultural land was damaged and crops lost
- 10 million people were estimated to have been displaced
- the main highway connecting Dhaka to the rest of the country was flooded isolating the capital
- 2/3 of the land was flooded
- 100,000 people had caught dysentery / diarrhoea
- Rice crops were devastated TWICE that year so farmers did not have time to recover their losses and replant
- Food insecurity caused some people to die from starvation
- \$150 million of aid was sought by Bangladesh
- \$300 million of crops were damaged in the initial floods
- Sundarbans threatened
 - National park with protected species and a natural coastal defence

Methods of managing flooding in Bangladesh

- Artificial levees
 - They built 350km of artificial levees costing \$6 billion

- Some of the levees are built of mud but increasingly they are using concrete to reinforce the natural levees
- These increase the size of the cross section of the river channels so they can hold more water
- Dams and reservoirs
 - They built 7 large dams Bangladesh to store excess water e.g. Kaptai dam
 - Holds back the monsoon rainfall in a reservoir
 - So they would not flood the surrounding areas
- Flood satellite imaging systems have been developed
 - More accurately predict flooding and allow more warnings to be given to the people
 - They are monitoring hydrographs and rainfall patterns in the major drainage basins
- Building 500 flood shelters
 - Built on pillars so they won't be overflowed when it is flooding
 - People can go there and it prevents injuries and deaths
- Setting up flood early-warning systems
 - People can evacuate the area beforehand
 - People are instructed of what to do in the middle of flooding
- Others
 - Flood action plan set up in 1989, funded by world bank
 - Negotiations to reduce deforestation in Nepal, funding tree planting programmes

Opportunities of living by rivers in Bangladesh

- Trade
 - The rivers are used for transportation of goods
 - Encourage trade between the capital city of Dhaka and the port city of Chittagong
- Industry
 - Factories are built along the riverside
 - River water used in the industrial process for cleaning and cooling machines.
- Agriculture
 - Water from the rivers is used for irrigating crops
 - The flat floodplains of the delta are very fertile because of the alluvium deposited during the flood
 - This causes high crop yields provide a source of food and cash crops for export e.g. rice and jute
 - Bangladesh can grow 3 crops a year
- Fish / shrimp
 - From the river and shrimps farmed in flooded fields provide an excellent source of protein
 - Sold for export

Coastal processes and landforms

2023年3月9日 23:50

Keywords

- <https://quizlet.com/cn/782306760/flash-cards/>

What cause the waves

- Wind blowing over the surface of the ocean
- Size factors
 - The stronger the wind the larger and stronger the waves
 - The longer the wind has been blowing over the sea the larger and stronger the waves
 - The longer the fetch (the distance over which the wind has blown over the sea) the larger and stronger the waves

Wave breaking

- The wave approaches the coast in the same direction as wind
- The sea floor becomes shallower and steeper
- The wave base slows down because of friction with the sea floor
- The wave becomes higher and eventually the top of the wave breaks
- The water flows up the beach in the same direction as the wind is blowing
 - The water flowing up the beach is called the swash
- Gravity causes the water to flow back down the beach to the sea perpendicular to the coastline
 - This is called the backwash

Types of waves

- Constructive waves
 - Wave is small, low wave height
 - Long wave length (about 100m)
 - Low frequency (6 per minute)
 - More sediment is transported onto the beach than removed
 - Beach is being built up
 - Beach profile is gentle
- Destructive waves
 - Wave is large, high wave height
 - Short wave length (about 20m)
 - High frequency (10-15 per minute)
 - More sediment is removed from the beach than transported in
 - Beach is being eroded
 - Beach profile is steep

Bays and headlands formation

- These are formed at a discordant coastline
 - Discordant coastline: the coast is made of different types of rock positioned perpendicular to the coastline
- Differential erosion
 - The rocks will erode at different speeds
- The weaker rock e.g. clay is eroded faster by corrasion and hydraulic action to create a bay
- The more resistant rock e.g. chalk erodes more slowly and remains to form a headland

Caves, arches, stacks and stumps formation

- Formed at the end of the headland
- A weakness in the headland e.g. a crack is eroded by hydraulic action to form a cave
- The headland is eroded from both sides and eventually the sea erodes a passage through the headland to form an arch

- The arch is continually eroded until the roof collapses to form a stack
- The waves continue to erode the stack making it smaller until it forms a stump
- Headland retreats towards the coastline

Wave-cut notch and wave-cut platform formation

- The wave water erodes the cliff by corrasion and hydraulic action, creating an undercutting called a wave cut notch
- The cliff above then collapses because there is no support underneath
- The fallen rocks are broken up by attrition and removed by waves
- The process will repeat itself causing the cliff face to retreat and leaving a gentle slope of solid rock with is called the wave cut platform

Longshore drift

- Waves are blown in the direction of the wind
- When the prevailing wind direction is at an angle the waves mostly approach the coast at an angle
- The swash moves the sand up the beach at an angle in the direction of the wave and wind
- The backwash moves the sand down the beach perpendicularly due to gravity
- The sand will gradually move along the beach in a zig-zag motion

Transportation

- Traction
 - Rolled along the sea floor
 - Cobbles
- Saltation
 - Bounced along the sea floor
 - Pebbles
- Suspension
 - Carried by the water
 - Sand
- Solution
 - Dissolved in the water
 - Finest material
 - Can't see

Spit formation

- Longshore drift transports sediment along the beach
- When the material reaches the end of the coastline, for example it changes direction, the longshore drift will continue to transport the material and deposit it in the open water
- Overtime the sediments build up to form a spit
- The fast flowing water of the river estuary means that the spit is stopped from growing all the way to the side
- The end of the spit often has a hook
 - This is caused by secondary (short term change) wind directions causing longshore drift to change the direction of sediment movement

Salt marsh formation

- Sometimes the spit may grow across a river mouth
- The river velocity will slow down behind the spit and deposit the river's load
- This will create an area of deposition behind the spit
- The deposited material will be colonised by plant species which can survive in the salt water conditions
- Their roots will trap more sediment and build a salt marsh behind the spit

Bar and lagoon formation

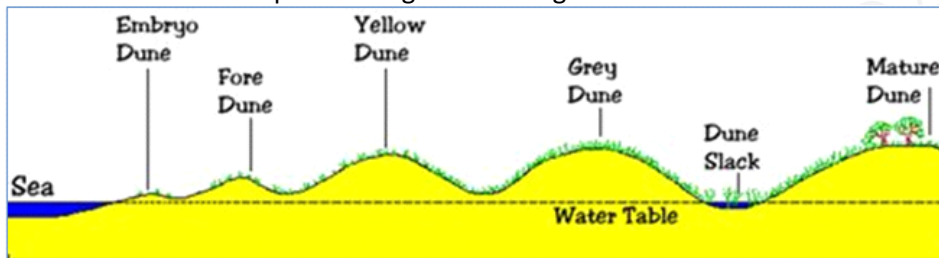
- Sometimes longshore drift forms a spit that grows right across a bay
- Joining up two headlands
- The water behind the bar becomes trapped and is called a lagoon

Tombolo formation

- Longshore drift forms a spit that grows from the mainland to join with an offshore island

Sand dune formation (SWOP)

- Sand
 - A large supply of sand e.g. wide, sandy beach exposed at low tide
- Wind
 - A strong onshore wind to dry out the sand and transport it inland by saltation
- Obstacles
 - Seaweed or driftwood on the beach to trap the sand to create the first dune called the embryo dune. They can be up to 1m high.
- Plants
 - Halophytes like marram grass can grow in salty and windy conditions
 - These plants grow on the yellow dunes (sand colour) and their roots stabilise the sand
 - They also trap more sand so the dune grows taller
 - When the plants die off, they decompose and start the formation of humus. As the dunes get older, the amount of humus increases and the dune becomes a grey dune
 - The environmental conditions are not so extreme: less salt, less wind, more humus/ fertile soil and so different plants can grow here e.g. heather



Dune slacks

- The valleys between the dunes are called slacks
- These are more sheltered and have more water so there is a greater variety of plant species which can survive here

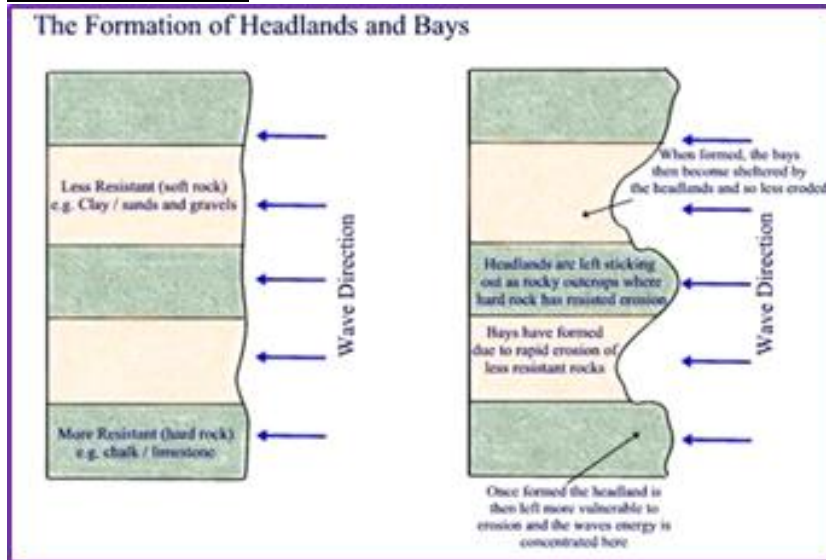
Plant succession

- The process by which plants improve the environmental conditions so that other plant species to grow there
- e.g. the marram grass stabilises the dunes and creates humus when it dies. This means the marram grass has created a more stable and fertile soil. Now different plants can grow successfully in the area.

Coastal processes and landforms diagrams

2023年3月10日 18:20

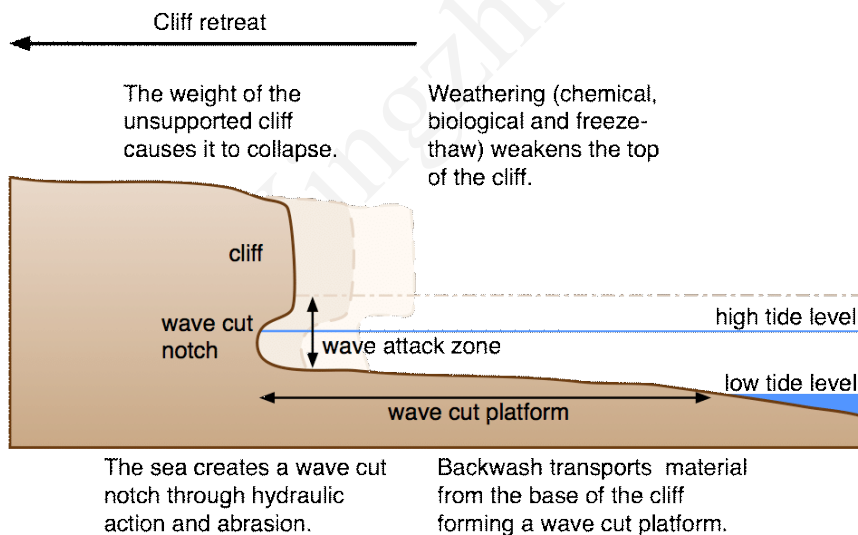
Bays and headlands



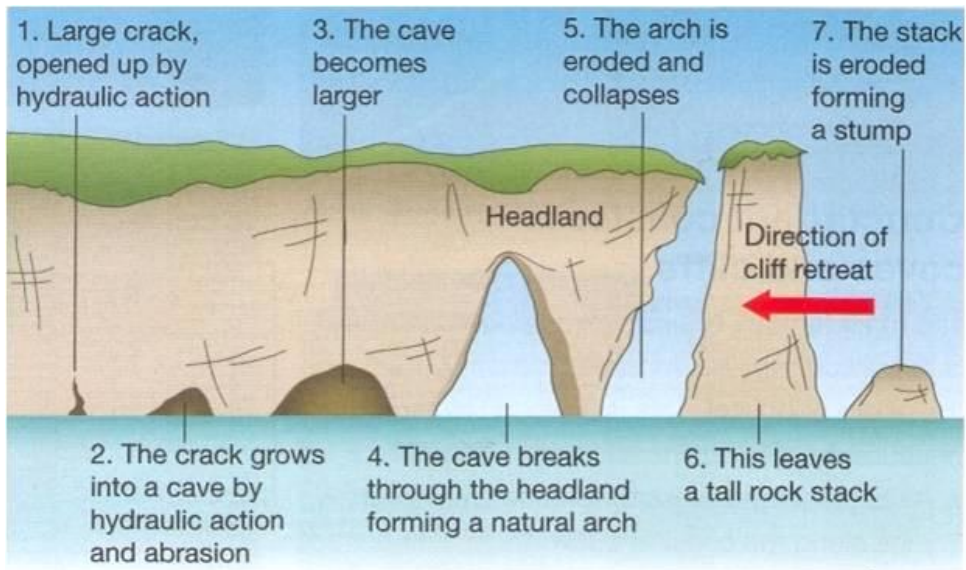
Wave cut platform

The formation of a wave cut platform

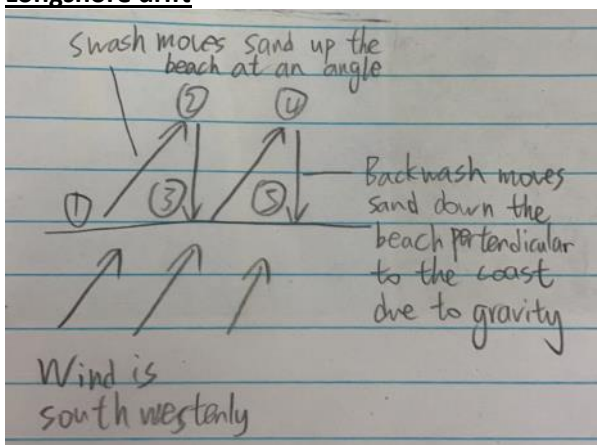
www.internetgeography.net



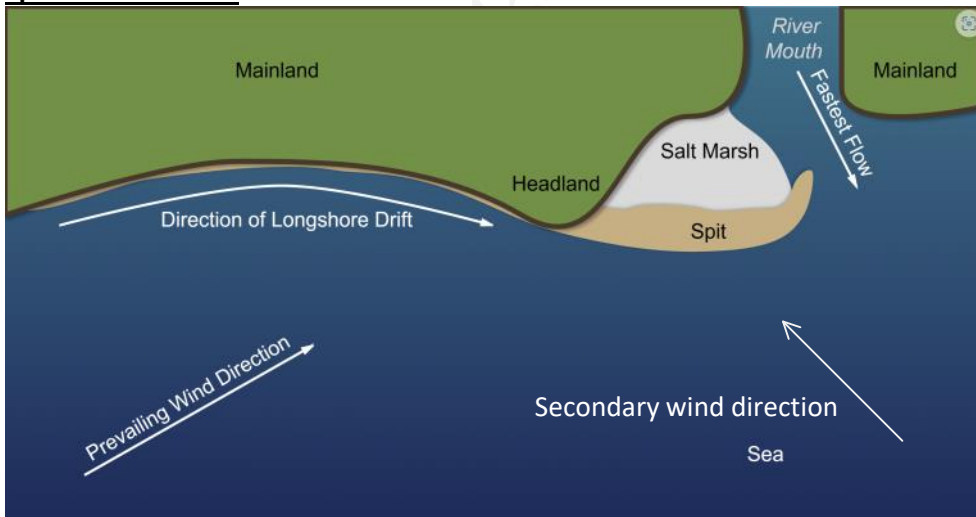
Caves, arches, stacks and stumps



Longshore drift



Spit and salt marsh



Coral reefs and mangrove swamps

2023年3月15日 20:10

Corals

- They are animals called polyps
 - Individual can be a size of a pinhead to a basketball
- Live in colonies
 - Build limestone skeletons for protection
- Two food sources
 - Zooplankton trapped by tentacles
 - Algae which photosynthesis and provide colour
 - Symbiotic relationship

Coral reefs

- The collection of thousands of corals
 - When one generation of animals die, the next generation builds its protective layer on top so the coral reef grows
- 25% of marine animals live in coral reefs
 - Acts as protection and food source
 - e.g. Crab, lobster, seahorse, shark
 - Creates a biodiverse marine ecosystem

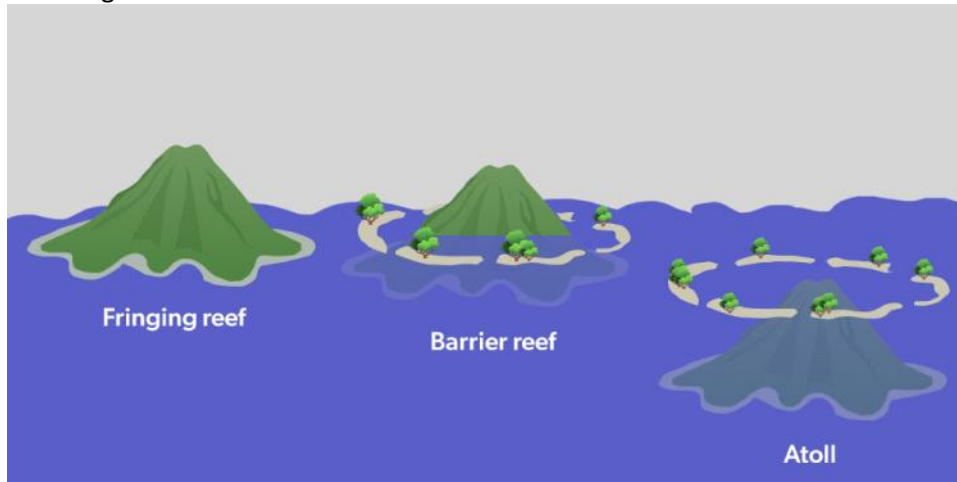
Conditions required for growth

- Warm water/seas
 - Corals need warm water for optimum growth
 - Sea surface temperature (SST) at least 21 °C
 - Located in eastern side of continents because of the warm ocean current there
- Shallow water
 - Maximum 40 metres deep
 - Polyps need sunlight for photosynthesis to produce energy
- Clear water
 - Water which does not contain a lot of sediment so that there is plenty of sunlight
- Clean oxygenated water
 - Polyps need a plentiful supply of oxygen so the water must not be polluted
- Food supply
 - Plentiful supply of zooplankton
 - The main source of food for corals
- Calm water
 - Lack of strong currents

Types of coral reefs

- Fringing reef
 - Directly attached to the shore or borders it with an intervening shallow channel or lagoon
 - The polyps are adapted to low wave energy conditions
 - e.g. Greater Caribbean region
- Barrier reef
 - Separated from a mainland or island shores by deep channel or lagoon
 - A greater distance away from the coast (several km)
 - Wider, older and larger than fringing reefs
- Atoll reef
 - More or less circular or continuous barrier reefs extends all the way around a lagoon without a central island
 - Form around submerged volcanic islands
 - Sometimes the volcanic island beings to sink because of plate tectonic movement

- The polyps build the coral structure upwards to maintain light conditions
- e.g. The Pacific Ocean



Opportunities of coral reefs

- Fishing industry
 - Coral reefs are biodiverse and contain many fish and seafood
 - Support a subsistence fishing industry as fish is good source of protein
 - Provides income
- Tourism
 - Reefs are a biodiverse and attractive ecosystem
 - Attract tourists for scuba diving and snorkelling
 - This creates job opportunities in hotel resorts and on diving boats
 - Tourists spend money in the local economy
- Protective barrier
 - Absorb wave energy before it reaches the beaches and slow down approaching waves
 - Protect coastlines from tsunamis and storm surges

Threats to coral reefs

- Coral bleaching
 - The polyps within coral die when the sea temperature rises or the water becomes polluted
 - Corals eject algae inside which provides energy by photosynthesis
 - About 10 per cent of the world's reefs are already dead, and a further 60 per cent are endangered.
- Cyanide
 - Used to capture fish for aquariums
- Agricultural run-off
 - e.g. pesticides and fertilisers
- Pollution
 - Urban pollution from land and air
 - Pollution of sea water e.g. oil spills, less sunlight from photosynthesis
- Climate change
 - Rising sea levels, increasing sea temperatures, changing ocean currents
- Disease
 - e.g. viruses which infect and kill polyps
- Habitat destruction from boating
 - Trawling, anchors, fishing nets
- Increasing acidity of sea water
 - From acid rain and pollution
- Tourism
 - Souvenir hunting, reef-walking, diving, boating
- Overfishing
- Greater sedimentation as rivers carry increased loads to the sea
 - Reduces light and oxygen levels

- Coral mining
 - Raw materials for building, industry, tourist souvenirs

Mangroves

- Salt tolerant forests of trees and shrubs which grow in coastal areas in the tropics
- They cover 25% of the tropical coastline

Conditions required for the growth of mangrove swamp

- Need warm temperatures above 24°C for tropical trees
- High annual rainfall above 1200mm
- Sheltered coastal area with less wave action
- Wide gentle slope with large tidal range (a wide area which is covered in sea water at high tide but not at low tide)

Importance

- Breeding ground and habitat for marine life
 - The muddy water are rich in nutrients from the decaying leaves
 - They are the breeding ground for a variety of fish and crustaceans (crabs, shrimp etc)
 - Many species which live in the coral reefs are born in mangroves
 - The coral reefs depend on the existence of mangroves
 - It is a biodiverse ecosystem and therefore important environmentally
- Coastal protection
 - The forests absorb the wave energy of storm surges and tsunamis
 - Protects coastal communities from flooding
- Fishing
 - Provide sources of fish and seafood for subsistence fishing
- Filters pollution
 - The marine life filter the water
 - Absorb waste from sewage and farming (chemical fertilisers)
 - Clean the sea water naturally
 - The mangroves protect the coral reefs from some sources of human pollution

Threats to the mangroves

- 35% of mangroves deforested in last 50 years (faster rate than rainforest deforestation)
- Cut down for wood
- Cleared for other uses
 - Rice cultivation
 - Shrimp farming
 - Tourist resorts
 - Coastal settlements
- Pollution from oil

Examples

- Grand Cayman in Caribbean Sea
- Originally 1/3 of island was covered in mangrove swamps and protected island from hurricanes
- At beginning of 21st century there was a lot of hotel development on the island and much of the mangroves have been cut down
- 60% of west coast mangroves have been cut down
- Tourism provides 75% of the islands GDP so it is important to create land to build the new resorts
- However, now the island is more vulnerable to the high winds and storm surges from hurricanes

Opportunities and hazards of coasts

2023年3月18日 16:39

Opportunities

- Flat land
 - Coastal land is often flat or gentle slopes
 - Good for building settlements, transport links e.g. roads/ railways, farming, and factories
- Deep water ports
 - Some coastal areas have deep water in areas which are sheltered from storms
 - This is good for building a port for importing and exporting goods
- Manufacturing industry
 - Often built near the port
 - Benefit from access to imported raw materials and for exporting finished products
- Extracting raw materials
 - Primary industries which extract raw materials from the sea can develop along coastline
 - E.g. fishing industry or oil and natural gas extraction
- Tourism industry
 - Can develop if the coast is attractive with beaches and has a suitable climate for outdoor activities e.g. sunbathing and swimming
 - Creates job opportunities for locals in tourism industry

Hazards and challenges

- Coastal erosion
 - Cause the cliff to collapse
 - Buildings destroyed e.g. home, farms and communication
- Coastal storms
 - Cause flooding from high energy waves and heavy rainfall
- Tsunamis
 - Earthquakes under sea floor causing a series of waves → flooding
- Tropical storms
 - Large scale ocean storms which form in the tropics where sea temperatures are above 28°C
 - They form in late summer when the sea has had sufficient time to warm up
 - Extremely high wind speeds (over 120km per hour)
 - Cause coastal flooding due to storm surges and heavy rainfall
 - E.g. cyclones, hurricanes, and typhoon

Managing coastal erosion

2023年10月25日 23:18

Hard engineering methods

- Sea wall
- Gabions
- Revetments
- Rock armour / Rip rap
- Groynes

Sea wall

- Description
 - Concrete walls / rock barriers built along the base of cliffs to prevent erosion
 - Some are built between the settlement and the sea to prevent flooding
 - Often curved to deflect the wave energy back into the sea
- Advantages
 - Very effective method to stop erosion and flooding
 - Increase access to the coast by creating a concrete pathway for walking
- Disadvantages
 - Expensive to build and maintain
 - Unattractive (block views)



Gabions

- Description
 - Metal cages which contain small rocks or pebbles
 - Used to create a wall at the base of the cliff to prevent cliff collapse + prevent erosion
- Advantages
 - Cheaper than sea walls
 - Effective at preventing erosion
- Disadvantages
 - Shorter life span than sea wall
 - Visually unattractive





•

Revetments

- Description
 - Wooden slatted barriers which are built mid-way up the beach and parallel to the sea
 - Encourages the waves to break before the base of the cliff and prevents erosion
- Advantages
 - The cheapest hard engineering method
 - Effective at breaking the force of the waves and reducing erosion
 - Sediment is trapped in front of the revetment → creating a bigger beach → attract more tourists
- Disadvantages
 - Not as strong as gabions + sea walls so not useful where waves are high energy
 - Do not give a total protection to the base of the cliff
 - Short life span because made of wood
 - Can restrict access to the beach + visually unattractive



•

Rock armour / rip rap

- Description
 - Large boulders of hard rock e.g. granite placed along the base of the cliff
 - Absorb wave energy and prevent erosion
- Advantages
 - Strong material so effective protection of the cliff
 - It looks natural
- Disadvantages
 - They are expensive to buy because they are large and heavy so very costly to transport (when bought abroad)
 - Rocks do not fit with local geology



Groynes

- Description
 - Barriers usually made of wood, built at right angles to the beach
 - Trap sediment and prevent longshore drift
 - This is to maintain the beach which can absorb wave energy
- Advantages
 - This uses the beach as a natural defence
 - Bigger beach can attract more tourists
- Disadvantages
 - Stop other beaches down the coast from getting sediment and often lead to more erosion down the coast
 - Not completely solving the problem
 - They are expensive to build and maintain
 - They are unattractive and can restrict beach access



Soft engineering methods

- Beach replenishment
- Planting vegetation

Beach replenishment

- Description
 - Replacing beach sediment e.g. sand/shingle which has been removed by erosion or longshore drift
 - The beach material is often dredged from offshore and transported to the beach
 - The beach absorbs wave energy and prevents erosion
- Advantages
 - A cheap method
 - Protects the natural look of the beach → this can encourage tourism
- Disadvantages
 - It has to be repeated every year
 - Offshore dredging can cause environmental problems



Planting vegetation (sand dune regeneration)

- Description
 - Plant salt tolerant vegetation e.g. marram grass to secure the sand
 - Sand dunes can develop
 - Area can be fenced off to keep people off newly planted dunes
 - Act as a barrier to wind erosion and flooding
- Advantages
 - Cheap
 - Develops the natural environment → popular with wildlife and people
- Disadvantages
 - Not effective against high energy waves
 - Takes time to plant marram grass + fence off the area
 - Restrict access to beach
 - Can be damaged by storms



Coastal management strategies

- Hold the line
 - Use many hard engineering techniques to make sure that the coastline is not eroded at all
 - Usually used where there is a high economic value land use on the coast e.g. a tourism resort
- Managed retreat
 - Some coastal management is in place, usually soft engineering
 - Some erosion and flooding is encouraged
 - Aim = to create beaches and salt marshes to protect the area further inland
 - Usually used where there is farmland which can be destroyed because it has low economic value
- Do nothing
 - No coastal management is used and the sea is allowed to erode and flood the land
 - Used where the land has no economic value or the wave energy is so high that it is not possible to control the erosion

Importance of coastal management

- Many people live on the coast
 - It is important to protect them from the hazards
- Many businesses and transport communications are located on the coast
 - The area is economically valuable
- The coastline often has fragile ecosystems
 - e.g. coral reefs and salt marshes
 - Take a long time to recover if they are destroyed so the area is environmentally important

Criccieth

2023年10月25日 23:19

Opportunities of Criccieth coastal location

- Attractive residential location
 - Coastal location + attractive coastal scenery of Cardigan Bay
- Attractive for tourists
 - Historical attractions e.g. Criccieth Castle
 - Attractive natural landscape with scenic Snowdonia National Park nearby
 - Large sandy beach and opportunity for sport fishing
- Tourism activity creating job opportunities
 - e.g. Dylan's restaurant, ice cream shops, hotels, camping / caravan site just outside of town
- Flat land along coast
 - Allow good communication links to be built
 - Railway station with trains to Birmingham
 - Main road A497 links town with other coastal resorts
- Lifeboat station
 - Calm water created by breakwater allows launch of life-saving boat

Hazards of Criccieth coastal location

- Rapid erosion of the bay area
 - Retreats 1m every 10 years
 - Threatening some of the houses + businesses located behind the beach
- Strong destructive wave created during winter storms
 - Causes coastal flooding of the area behind the beach + increases the rate of erosion
- Climate change effects
 - Storm frequency and intensity are increasing
 - Sea levels are rising by 3.2 mm per year due to climate change causing ice caps to melt
 - Threatening to flood the beach area and properties behind the beach

Coastal management strategies used

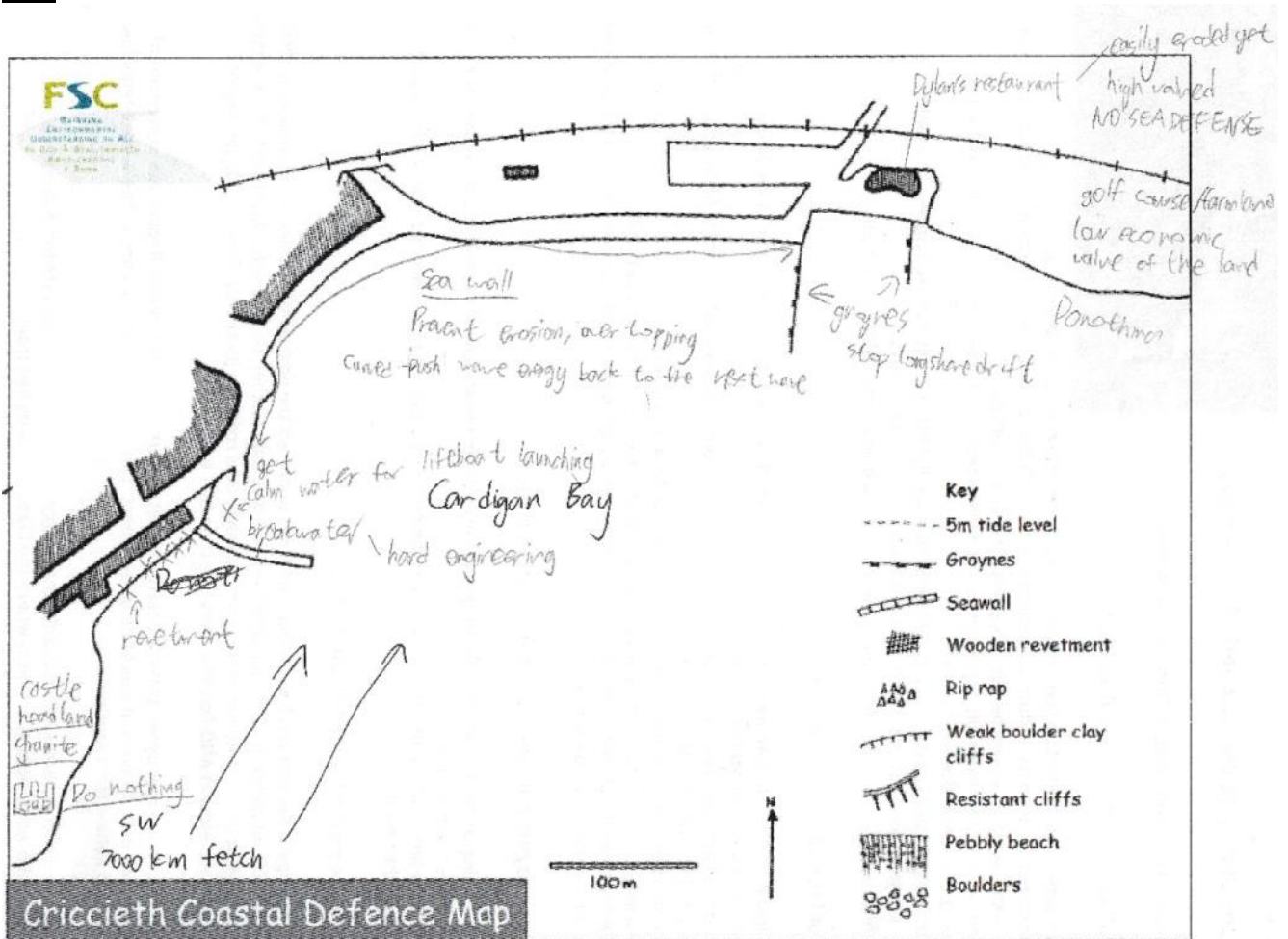
- Do nothing
 - At Castle Rock
 - The granite is resistant to erosion
 - At golf course
 - The land has low economic value
- Hold the line
 - From Castle Rock to Dylan's Restaurant
 - High economic value of the properties behind the beach

Coastal defence methods used to hold the line

- Seawalls
 - The original sea wall was built in Victorian times to protect the original railway line
 - It was rebuilt in 1960s at a cost of £4,000 per meter
 - A concrete curved sea wall was built further along beach
 - Reflects the energy of a wave that has just broken into the next oncoming wave, thus reducing its energy
 - Costs £6000 per meter
 - Reduce erosion and flooding
 - Very effective but expensive
- Groynes
 - Several wooden groynes at West Beach and 2 at eastern end of the beach
 - Reduce the movement of sand by longshore drift to prevent loss of beach sediment
 - The beach will absorb some of the wave energy and protect the land behind from erosion

- Breakwater
 - The concrete breakwater absorbs the energy of breaking waves and creates an area of low energy environment / calm water behind it
 - This is where the lifeboat is launched from
- Rip rap / rock armour
 - Large boulders of granite are placed around the breakwater to absorb the wave energy and protect it from erosion
- Wooden revetment built on cliff face
 - To prevent cliff collapse because there are expensive houses on the cliff top
 - The stone behind the wooden barrier allow for water to drain easily from the cliff
 - The rip rap boulders at the foot of the cliff prevent the wave energy eroding the base of the cliff

Map



Case study sheet

2023年11月1日 12:34



Criccieth
case stud...

©Xingzhi Lu 2024

Case study of a coastline: Criccieth, Cardigan Bay, Wales

Location: Coastal resort town on Cardigan Bay, Wales



Opportunities of Criccieth coastal location

- **Attractive residential location:** coastal location, attractive coastal scenery on Cardigan Bay
- **Attractive for tourists:** Historic attractions e.g. Criccieth Castle, the attractive natural landscape with scenic Snowdonia National Park nearby, large sandy beach and opportunity for sport fishing
- Tourism activity **creates job opportunities** e.g. Dylan's restaurant, ice cream shops, hotels and at the camping/caravan site just outside of town
- Flatter land along coast allowed **good communication links** to be built: railway station with trains to Birmingham and main road A497 links town with other coastal resorts
- **Lifeboat Station:** calm water created by breakwater allows launch of life-saving boat

Hazards of Criccieth coastal location

- Rapid erosion of the bay area which retreats 1m every 10 years is threatening some of the houses, businesses located behind the beach
- Strong destructive wave energy created during winter storms causes coastal flooding of the area behind the beach and increases rate of erosion
- Storm frequency and intensity are increasing due to climate change
- Sea levels are rising by 3.2mm per year due to climate change causing ice caps to melt.
- The rise in sea levels and more frequent strong waves caused by storms are threaten to flood the beach area and properties behind the beach

Coastal management: Two management strategies used:

1. **Do nothing:** at Castle Rock because the granite resistant to erosion and at the golf course because the land has low economic value
2. **Hold the line:** from Castle Rock to Dylan's Restaurant because of the high economic value of the properties behind the beach

Coastal defense methods used to hold the line:

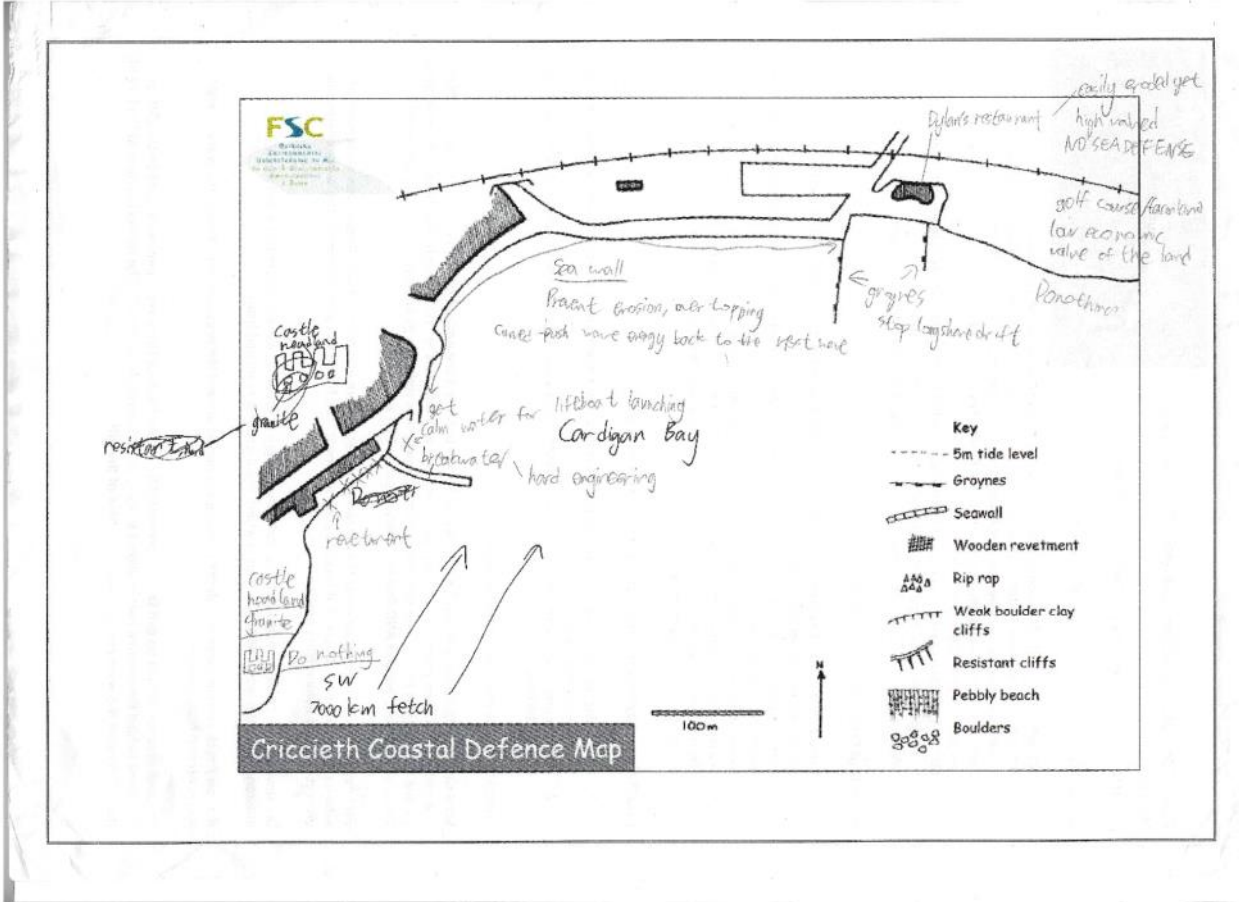
Seawalls: the original sea wall was built in Victorian times to protect the original railway line. It was rebuilt in 1960s at a cost of £4,000 per meter. A concrete curved sea wall was built further along beach. This reflects the energy of a wave that has just broken into the next oncoming wave, thus reducing its energy. Costs £6000 per meter. These walls reduce erosion AND flooding. Very effective BUT expensive.

Groynes: several wooden groynes at West Beach and 2 at eastern end of the beach. Reduce the movement of sand by longshore drift, to prevent loss of beach sediment. The beach will absorb some of the wave energy and protect the land behind from erosion.

Breakwater: the concrete breakwater absorbs the energy of breaking waves and creates a low energy environment/calm water behind it. This is where the lifeboat is launched from.

Rip rap / rock armour: large boulders of granite are placed around the breakwater to absorb the wave energy and protect it from erosion.

Wooden revetment built on cliff face: to prevent cliff collapse because there are expensive houses on the cliff top. The stone behind the wooden barrier allow for water to drain easily from the cliff. The rip rap boulders at the foot of the cliff prevent the wave energy eroding the base of the cliff.



Measuring the weather

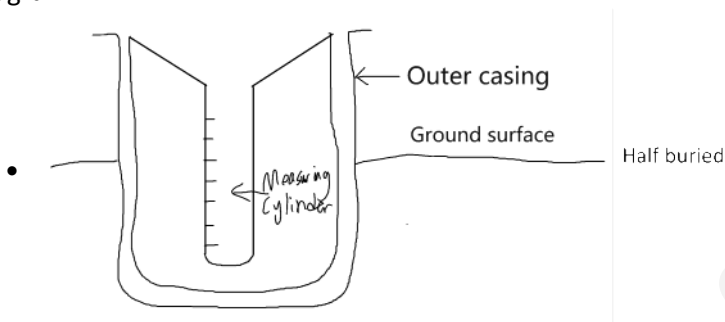
2023年10月9日 20:02

Keywords

- <https://quizlet.com/cn/838128164/flash-cards/>

Rain gauge - explanation

- Measure precipitation in mm
 - * Precipitation can be rain / snow / sleet / hail
- A hollow cylinder which contains a funnel and a measuring cylinder to collect the water
- Held in another outer casing
- Measuring cylinder is made of a fixed diameter so comparisons can be made between different rain gauges
- Diagram



Rain gauge - site factors

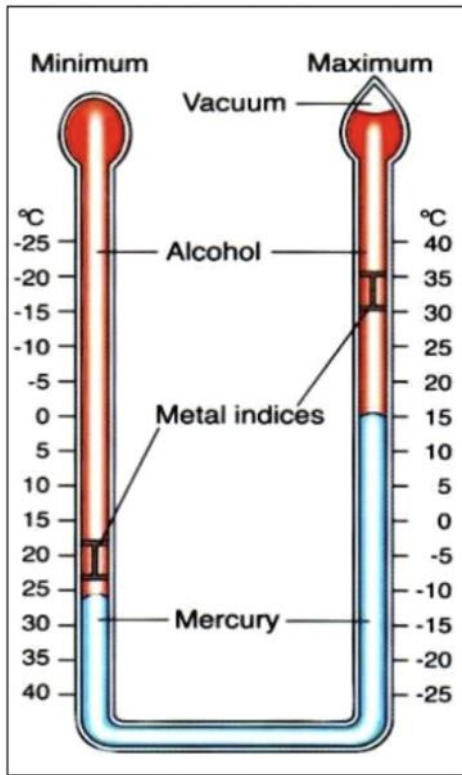
- Grass and not on hard surfaces
 - Avoid splashes entering into the gauge
- Part buried for stability
- Rim 30cm above ground surface
 - Avoid surface runoff entering
- No trees or roof overhanging
 - Avoid shelter and too little rain entering
- Away from buildings, trees, or other objects
 - Avoid drips entering the gauge

Rain gauge - taking reading

- At the same time of day at 9 a.m., every 24 hours
- Take out the funnel + measuring cylinder
- Read the amount of water in the measuring cylinder in mm, read at the bottom of the meniscus
- Melt any snow / hail before taking reading
- Pour away the water
- Reset the instrument

Six's thermometer / maximum-minimum thermometer - explanation

- Records the maximum + minimum temperatures in a 24 hour period
- Highest temperature
 - As temperatures rise, the mercury in the maximum thermometer expands
 - Pushes up the metal pin
 - When temperatures cool, the mercury contracts but the metal pin is left in place to record the highest temperature
- Lowest temperature
 - When the temperature falls, the alcohol contracts in the minimum thermometer
 - Pulls the metal pin upwards with mercury
 - When the temperature rises, the alcohol expands but it flows pass the metal pin leaving it in place to record the lowest temperature
- Diagram

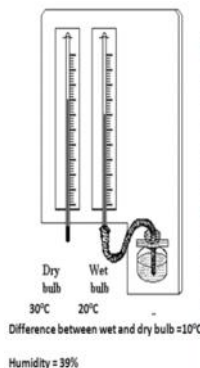


Six's thermometer - reading

- At the same time of day at 9 a.m., every 24 hours
- Read from the bottom of the pins (*reversed scale for minimum temperature)
- The level of the mercury records current air temperature
- Pins are reset using a magnet

Hygrometer / wet and dry bulb thermometer

- Measure relative humidity as a percentage
- Have two thermometers that contain mercury to measure temperature
- Dry bulb is a normal mercury thermometer which measures actual air temperature
- Wet bulb is a normal thermometer but the bulb is covered with a muslin connected to a reservoir of water
- When water evaporates from the cloth latent heat is used so the air is cooled and the temperature on the wet bulb thermometer will be a few degrees lower than air temperature
- When air is humid, it is already saturated with water vapour and less evaporation will be able to take place
 - Less temperature drop on the wet bulb
- The smaller the difference between the dry + wet bulb temperature, the greater the humidity
- A conversion table is used to calculate the humidity using the dry bulb temperature and the difference between the two temperatures
- Diagram



Dry Bulb Temperature (°C)	Difference Between Wet Bulb and Dry Bulb Temperatures (°C)															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-20	100	28														
-18	100	40														
-16	100	48														
-14	100	55	13													
-12	100	61	21													
-10	100	66	28													
-8	100	71	34	13												
-6	100	75	40	20												
-4	100	77	44	27	11											
-2	100	79	48	32	20	1										
0	100	81	49	35	28	13										
2	100	83	49	37	33	20	8									
4	100	85	50	36	42	27	14									
6	100	86	52	39	46	35	22	10								
8	100	87	54	42	51	40	28	17	6							
10	100	88	56	45	54	43	33	24	13	4						
12	100	88	58	47	57	46	38	29	19	10	2					
14	100	89	59	49	60	50	41	33	25	16	8	1				
16	100	89	60	51	62	54	45	37	29	21	14	7	1			
18	100	90	61	52	64	56	48	40	33	25	19	12	6			
20	100	91	62	54	66	58	51	44	36	30	23	17	11	5		
22	100	92	63	55	68	60	53	46	40	33	27	21	15	10	8	
24	100	92	64	56	69	62	55	49	42	36	29	23	18	14	9	4
26	100	92	65	57	70	64	57	51	45	39	34	28	22	18	13	9
28	100	93	66	58	71	65	59	53	47	42	36	31	26	21	17	12
30	100	93	66	59	72	66	61	55	49	44	39	34	29	25	20	16

Barometer

- Measure atmospheric pressure in millibars (mb), average is 1013 mb
- An aneroid barometer has a chamber containing a vacuum

- As air pressure changes, the chamber contracts & expands
- This movement is recorded by the needle on the front of the barometer
- The second needle is moved manually to record the current atmospheric pressure
 - Used to show the change in pressure over the next 24 hour period

Barometer - reading

- The pressure is recorded every 24 hours at the same time at 9 a.m.
- Open Stevenson's screen to get the barometer
- Take reading in millibars by looking at the black arrow
- Reset the instrument by moving the gold arrow in line with the black arrow to record current pressure

High / low air pressure effect

- High air pressure
 - Clouds cannot be formed
 - No precipitation
- Low air pressure
 - Clouds are formed
 - Precipitation / storms occurs

Anemometer

- Measure wind speed in m/s
- Light rotating cups are blown around by the wind
 - The faster the wind, the faster the cups move
- The revolutions are counted & converted into metres per second/ km per hour or knots

Anemometer - site factors

- Located on top of building for accurate measurement
- Placed away from shelter of buildings or trees which may reduce wind speed

Wind vane / weather vane

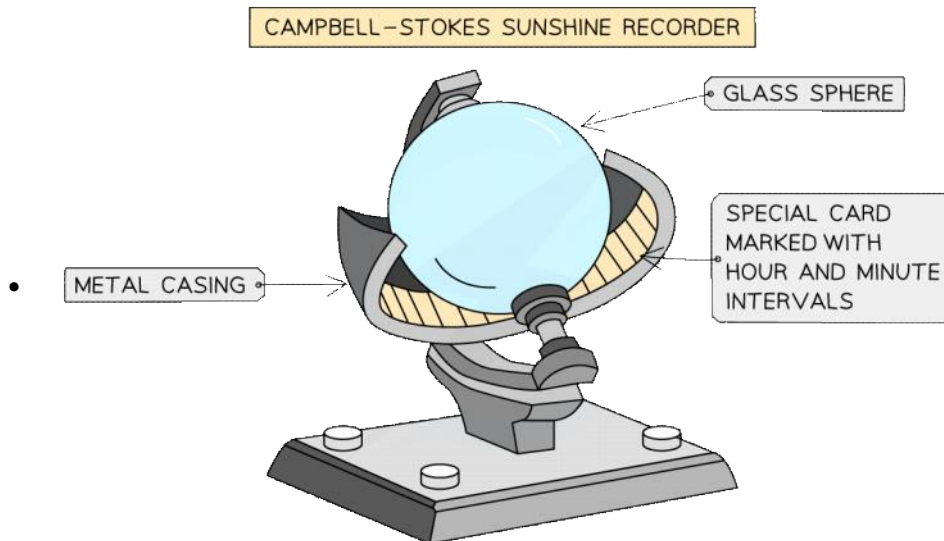
- Measure wind direction
- An arrow rotates freely above four fixed pointers which show the four compass points so direction can be worked out
- Arrow can be blown around by wind
- The arrow points in the direction the wind is coming from which is the name of the wind direction

Wind vane site factors

- Located on top of buildings or in open space
- Placed away from the shelter of buildings or trees

Sunshine recorder

- Record hours of sunshine
- A glass ball with a piece of paper located behind it
 - The paper is marked in minutes + hours
- When the sun shines, the rays pass through the glass ball and burn the paper recording the time of sunshine
- If the clouds block the sun, the paper is not burned
- The position of the sun moves overhead & it burns a line in the paper.



Sunshine recorder - reading

- At the same time of day at 9 a.m., every 24 hours
- The paper is removed + work out the length of the burn
- The length of the burn indicates the hours + minutes of sunshine
- The paper is replaced to reset the instrument

Sunshine recorder - site factors

- Located in open space away from the shade of trees or buildings
- The ball is facing the sun i.e. facing south in northern hemisphere
- Often on top of the Stevenson's screen

Cloud cover

- Estimated by eye
- Measured in Oktas (no = 0 Oktas, full = 8 Oktas)
 - e.g. If half the sky is cloud covered, this is 4 Oktas.
- If the sky cannot be seen because of pollution, smoke or fog it is called obscured

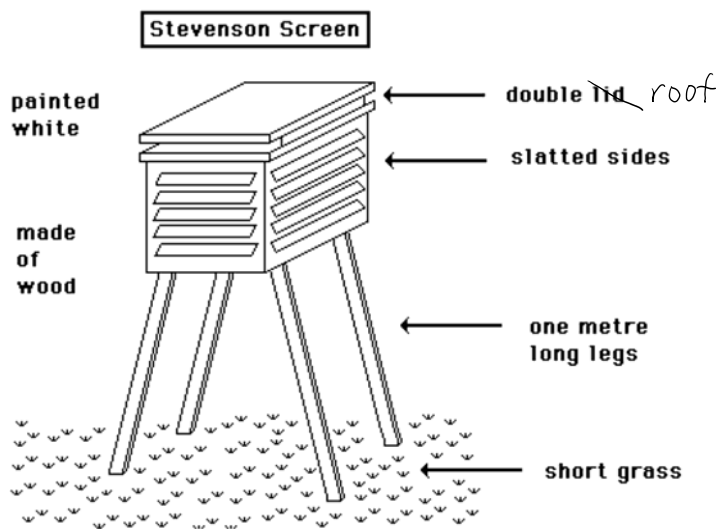
Cloud types

- Cumulus
 - Cauliflower shaped
 - Flat bases
 - Fluffy, billowing
 - Range of altitudes
 - White, fair weather
- Stratus
 - Continuous layers
 - Covers most of the sky
 - White → grey
- Stratocumulus
 - Layer and heaped low level clouds
- Cirrus
 - Horsetail shape
 - High altitude, thin, wispy
 - Made of ice crystals
 - Fair weather
- Nimbus
 - Raincloud
- Alto
 - High

- Cumulonimbus
 - Heaped rainclouds linked with thunderstorms & heavy rain
 - Large altitudinal range
 - Tall, grey coloured
- Nimbostratus
 - Heavy layer of cloud which is dark
 - Brings continuous rain / drizzle

Stevenson's screen

- Contains
 - Six's thermometer
 - Hygrometer
 - Barometer
- It protects them from direct heat radiation + precipitation
- It allows shade temperatures to be recorded
- It has standardised characteristics so that weather recordings around the world can be compared.



Stevenson's screen - characteristics

- Wooden box to reduce absorption of sun's heat
- Painted white to reflect the sun's radiation
- Double roof to create air layer in roof (allow air in)
- Slatted sides to let the air circulate, slanted downwards to prevent direct sunlight getting in
- Hinged door opens downward for easy access to instruments
- 125cm high legs: standardised around the world to allow comparison, avoid measuring ground temperature

Stevenson's screen - site factors

- In open space & away from obstacles e.g. buildings or trees
 - Reduce influence of heat from buildings or shade from trees
- On short grass to reduce impact of heat from ground
 - Not on concrete or tarmac which absorbs heat
- On legs 1.25m long
 - To measure air and not ground temperature
 - Standardise height for reliable comparison between weather stations
- Door facing away from direct sunshine (facing north in northern hemisphere)
 - Avoid direct sunlight when door is opened.
- In a protected area of the school e.g. fenced off
 - Avoid tampering by humans or harm from animals

Climate + ecosystems

2023年10月9日 20:03

Climate

- The average weather condition e.g. temperature and precipitation over a period of 30 years.

Ecosystem

- The community of living (biotic) + non-living (abiotic) things interacting with each other in an area
 - Biotic things include plants + animals
 - Abiotic things include soil + water

Factors causing difference in global temperatures

- Latitude
 - The curve of the Earth means that the position of the sun in the sky is different in different latitudes
 - This affects the concentration of the solar radiation (energy) on the region
 - Around the Equator the sun is overhead + the solar radiation is concentrated over a smaller area which increases average temperatures
 - The solar radiation passes through thinner atmosphere so less energy is lost by reflection / absorption and more energy reaches the Earth's surface
 - In polar regions, the solar radiation comes in at an angle + is spread over a larger region. This means the temperatures are lower.
- Altitude
 - Higher altitudes have lower temperatures
 - Temperature decreases 0.6°C for every 100m increase in altitude
 - This is because the air density is lower at higher altitude + there are less molecules to absorb heat
- Distance from the sea
 - The sea heats up slowly in summer and cools slowly in winter because water has a high specific heat capacity
 - This means the sea cools coastal regions in summer but keeps them warmer in winter
 - The coastal regions have a lower annual temperature range than inland regions
- Ocean currents
 - Warm ocean currents e.g. North Atlantic Drift raise winter temperatures in coastal areas; cold ocean currents e.g. Californian cool them down in summer

Convictional rainfall

- Solar radiation warms the ground and air above it
- Warm air evaporates water from vegetation and ground to create water vapour in air
- Warm, moist air rises
- As air rises it cools down
- When condensation point is reached water vapour condenses to form water droplets which creates cumulus clouds
- Cumulonimbus clouds form when the cumulus clouds are too heavy and cannot hold water droplets
- Heavy rain falls at 3 p.m.
- Rains everyday

Relief rainfall

- When warm, moist air from the ocean hits mountains, it is forced to rise
- The moist air rises + cools
- The water vapour condenses in to water droplets producing clouds
- Precipitation on the windward side of the mountains
- The air then continues to move to the other side of the mountain and is not carrying little moisture
- On the leeward side of the mountain, the cool air sinks and warms up

- The air on the leeward side of the mountains is warmer so it can hold more water vapour and any moisture will evaporate + no condensation
- So there is no rainfall + clear skies
- The leeward side of the mountain is called the rain shadow

Global wind circulation causing difference in global rainfall

- At the Equator hot, wet air rises
 - This creates low atmospheric pressure on the ground
 - Rising air cools, water vapour condenses, clouds form and convectional rainfall happens in the Equatorial region
- High altitude air moves towards the poles and cools in the upper atmosphere
- In the Tropic of Cancer + Capricorn regions (20-30° north + south), the cool air sinks
 - This creates high atmospheric pressure on the ground
 - As the air sinks, it begins to warm up
 - The warmer air cannot condense any water vapour in the air and so there is no rain
 - These are the hot, desert regions which are sometimes called the tropical desert regions
- The circulation of air between the Equator and the Lines of the Tropics are called the Hadley Cells

© Xingzhi Lu 2024

Equatorial climate and ecosystem

2023年10月9日 20:02

Keywords

- <https://quizlet.com/cn/838128740/flash-cards/>

Tropical forest distribution

- In a narrow belt around the Equator
- Between 8° N & S of Equator
- Places
 - South America = Amazon
 - Central Africa = Congo
 - Southeast Asia = Indonesia
- Exceptions
 - Kenya, East Africa
 - Around the equator but no rainforest
 - 1000m above sea level → too cold

Climate

- High rainfall
 - Over 2,000mm per year
 - Evenly distributed throughout the year
 - Caused by high temperatures during the day causing heavy convectional rainfall in the early afternoon
- High temperatures all year round
 - Average mean monthly temperature of 28°C
 - Because the TRF is located around the Equator where the sun is high in the sky all year round
 - Receive lots of solar radiation around the whole year
 - Lots of radiation concentrated in a small area
- Low annual temperature range
 - Difference between the average temperature of the hottest and coldest month is low
 - Approximately 3°C
 - This is because the sun is high in the sky all year round so insolation is high all year round
 - Insolation = incoming solar energy
- Low diurnal temperature range
 - Difference between the average daytime and night-time temperature is low
 - Heavy cloud cover in TRFs
 - Clouds reduce the amount of heat lost at night by reabsorbing escaping heat so temperatures do not decrease significantly at night
- High humidity
 - Usually over 80%
 - There is a large amount of water on plants + the ground because of the high rainfall
 - There are high rates of evaporation and transpiration all year round because of the high temperatures → lots of water vapour in the air → high humidity
- Low atmospheric pressure
 - Warm, air is rising

Vegetation characteristics in tropical rainforests

- High biodiversity of plants
 - Constant hot and wet climate is the perfect climate for plants to grow
 - Results in a constant growing season all year round
- Grow in distinct layers

Vegetation layers

Layer	Plant	Animals
Forest floor	<ul style="list-style-type: none"> • 1% of light • Very dark so little grows except fungi 	<ul style="list-style-type: none"> • Insects and fungi live in decaying leaf matter
Shrub layer	<ul style="list-style-type: none"> • Low shrubs 4m high • 5% sunlight here • Large leaved plants e.g. ferns 	<ul style="list-style-type: none"> • A lot of insects → food for bird / geckos / bats / tree frogs • Big cats e.g. jaguar and snakes live on this layer so they can spot prey
Under canopy	<ul style="list-style-type: none"> • Trees 20m high (& young trees) • Less dense than main canopy • Can survive in less sunlight by having larger leaves 	Same as below ↓
Main canopy	<ul style="list-style-type: none"> • Trees 30-40m forming a continuous canopy • Few lower branches • Very little light gets through canopy 	<ul style="list-style-type: none"> • Most abundant wildlife • Seed and fruit provide plentiful food supply • Many animals e.g. toucans, sloths + tree frogs, monkeys
Emergent layer	<ul style="list-style-type: none"> • Tall trees up to 50m high • Few lower branches • Grow above others to get full sunlight 	<ul style="list-style-type: none"> • Only lightweight creatures that the thin branches can support • e.g. monkeys, birds, butterflies

Vegetation adaptations

- Lianas
 - Vine like plant which uses the large trees as a support + grow up them to reach the sunlight.
- Epiphytes
 - Grow on trees to get light + trap water + use dead leaves from the tree as nutrient
 - e.g. moss, lichen + orchids
- Drip tips
 - Pointed end of leaves to get rid of excess water
 - Excess water affect rate of transpiration and may cause the leave to break off
- Buttress roots
 - Grow both above and underground
 - Support and stability as trees are high

Soil characteristics

- Deep
 - The high temperatures + rainfall mean the bedrock is rapidly weathered
- Red
 - Abundance of iron oxides (red) in soil
- Infertile
 - Rapid uptake of minerals (nitrogen, potassium, phosphorus) by the roots of dense, fast growing forest plants
 - Leaching
 - Water absorbs nutrients and takes them downwards

How soil gain nutrients

- Leaves and dead animals decomposing on forest floor
- Nutrients in rainfall
- The breakup of rock underneath the soil

Causes + effects of deforestation

2023年10月11日 19:56

Causes of deforestation

- Logging
 - Trees cut down for the value of the wood for other purposes
 - High global demand for hardwood e.g. mahogany + teak to use for furniture and paper
 - Wood used as fuel wood for cooking as well
- Plantation agriculture / commercial farming
 - Farmers clear forests to plant palm oil trees / sugar cane to sell
- Cattle ranching
 - Forest is cleared so the land can be changed to grassland for cattle to graze
 - Cattle are sold for beef
- Subsistence farming / slash and burn method
 - The forest is burned to clear the forest quickly
 - The ash is fertile and for a few years the soil is productive enough for crops to be grown to feed the farmer and his family
 - After a few years the fertile soil is eroded by heavy rainfall and washed away to rivers so it is less fertile
 - The farmers then clear another area of the forest
- New settlements
 - New roads are built and the forest cleared to provide new settlers with farm land
- Mining
 - Valuable minerals e.g. gold + coal are in the ground or oil underground
 - Forest is cleared to access the minerals / oil + build access roads
- Hydroelectric power
 - Rainforest rivers are dammed + reservoirs flood the forest

Why deforestation causes vegetation to be degraded

- Burning the forest to clear the land use for other purposes causes the trees and the leaf litter beneath to be destroyed
 - The microorganism below are also killed during burning and dies due to the lack of nutrients from leaf litter
 - Therefore less nutrient is released back into the soil causing reduced plant growth
- The loss of trees leads to the loss of protection of soil from heavy rain through interception
 - There will be more leaching → nutrients in the soil to be lost beneath
 - Increased soil erosion so top soil is lost
 - Soil becomes increasingly infertile

Local impacts of deforestation on the environment

- Water + soil contaminated by toxic waste from the oil industry due to oil leaks from illegal tapping
 - Animals and plants killed by oil as it is toxic
- Increased flooding because there is no tree canopy to intercept the rainfall
- Increased leaching reduces fertility of the soil
- Increased run off causes soil erosion which reduce soil fertility
- Habitats of plants + animals destroyed so they cannot survive
 - e.g. oil contaminates water and soil
 - Loss of biodiversity
 - Some plants + animals extinct
- Eventually a decrease in rainfall + potential droughts because there are no trees for evapotranspiration + so there is less water vapour in the air

Local impacts of deforestation on human

- Homes of indigenous population destroyed

- Native people may be infected by pathogens that is carried by people from outside world that is fatal to them
- Conflict between native population + new settlers can be violent
 - The native people fight with new settlers / loggers / oil companies to defend their land
 - Native people die from conflicts
- Burning of trees causes air pollution + health issues e.g. breathing problems

Global impacts of deforestation

- Loss of carbon sink
 - Burning of trees increases carbon dioxide (a greenhouse gas) in the atmosphere
 - Reduction in carbon dioxide intake by plants so less CO₂ is removed from the atmosphere
 - Results in an increase in CO₂ in the atmosphere + contributes to climate change
- Loss of oxygen source
 - No trees are photosynthesising so less oxygen is produced
 - Currently 1/3 of world's oxygen comes from TRF
- Dead zones form at mouths of river
 - Soil is washed into the river due to increased erosion and deposited at mouth
- Loss of potential medicines
 - Over half modern medicine came from TRF plants
 - Many species become extinct before they are discovered

Native people in the rainforest

- Originally hunter gatherers lived in forest
 - Hunt animals + collect fruits for food
- Subsistence farmers as well using slash + burn method-
 - Burn small area of forest so ash provides some nutrients
 - Grow crops for 3 years
 - Soil becomes infertile because there are no trees to protect soil
 - Clear another area of forest
 - Allow the forest to regrow

Hot desert climate + ecosystem

2023年11月1日 19:10

Keywords

- <https://quizlet.com/cn/852883603/flash-cards/>

Distribution of Tropical deserts

- Unevenly distributed
- Located on the Tropic of Cancer + Capricorn
 - e.g. Cancer = Saharan, Capricorn = Great Sandy Desert
- Mostly found in sub-tropical region around 15-30° N or S of Equator
- Often on the western side of the continents e.g. Atacama in South America
- Often in centre of continents e.g. Gobi

Climate

- High mean temperature of the hottest month
 - Approximately 30°C
 - When the sun is overhead in summer, the incoming solar radiation is concentrated + temperatures are high
- High annual temperature range
 - Temperatures vary throughout the year with distinct seasons
 - Hot summer with average temperatures up to 30°C + in winter average temperatures can be cool e.g. 10°C
 - Sun is overhead in the other hemisphere in winter → solar radiation spread out → low temperature
- High diurnal temperature range
 - Day time max. temperatures can be above 50°C; night time temperatures can be below freezing
 - No cloud to reduce incoming solar radiation during the day (so daytime is hot) or to prevent heat loss at night (so nights are cold)
 - High altitude deserts are very cold at night
- Low total rainfall
 - Must be less than 250mm in a year (deserts are arid regions)
- Unreliable + unpredictable rainfall distribution
 - No seasonal rainfall pattern
 - There can be many months with no rain and sudden heavy rainstorms which create flash floods
- High atmospheric pressure
 - Air is descending due to the global wind circulation (descending arm of the Hadley Cell) / on leeward side of a mountain range
- Cloudless skies + low humidity
 - Air is descending + air warms up as it descends
 - So there is no condensation of any water vapour

Reasons for aridity

- Descending air in the Hadley cell
 - Deserts are located in the high pressure area where the air circulation of the Hadley Cell is sinking
 - The air warms up as it sinks → there is no condensation → no rain droplets are produced
- Rain shadow of a mountain range
 - Desert regions are found on the leeward side of mountain ranges
 - Air rises up to higher altitudes along one side of the mountain
 - Water vapour condenses and it causes precipitation, leading to relief rainfall
 - Air then continues to move to the other side of the mountain and is now carrying little

- moisture
- The cold, dense air sinks and warms up as it sinks
- There is no condensation as the air is warm so no rain droplets are produced
 - These are called rain shadows (no rain)
- Cold ocean current
 - There is a cold ocean current along the coast where deserts are found
 - e.g. Peru current + Atacama Desert; West Australian current + Great Sandy Desert
 - Water from cold polar regions flows towards equator along west coasts of continents
 - The air is cooled above the cold ocean and condensation is forced over the sea, producing sea fogs
 - The air blowing onto the land is now dry so a desert forms
- Continentality
 - The desert is located in the centre of the continent and is a long distance from any ocean or lake so there is no source of moisture
 - Any moisture was precipitated before the wind reaches the desert area
 - The air is dry and cannot produce rain

Desert soil

- Infertile + contains few plants
 - There is very little dead matter for decomposition + it is too dry for the decomposers to work effectively so there are very few nutrients added to the soil
 - Plants cannot get nutrients for growth
- Is a degraded soil (eroded)
 - The soil is not protected by vegetation from the wind or the infrequent flash floods
 - The soil is easily eroded + any nutrients washed away
- Sandy soils are mobile and loose
 - Mobile = plants can be easily covered
 - Loose = plants can be uprooted
- Remains dry
 - Soil is hard baked which makes infiltration difficult
 - Even when it rains the water runs off the surface quickly
- Grey + saline
 - Evaporation of water brings salt up to the surface + deposit it when water evaporates

Vegetation characteristics

- Vegetation is sparse + low lying
- Low biodiversity
 - Only a few plants specially adapted to the arid / dry conditions + unpredictability of the rainfall can survive
- Named plant = cactus / Joshua tree

Vegetation adaptations

- Low density / low lying so not competing for limited water and nutrients
- Succulents: have fleshy stems + leaves to store water
- Pleated so it can expand to store more water
- Deep tap vertical roots to reach groundwater (up to 50m)
- Wide, shallow horizontal roots to access any rain water before it evaporates
- Spines to reduce water loss from transpiration
- Ephemeral
 - Drought resistant seeds can lie dormant for years until it rains
 - Then they complete their life cycle (germinate, flower & produce seeds) within 2-3 weeks.

Animal characteristics + adaptations to arid/dry climate:

- Named animal = Fennec Fox
- Nocturnal
 - Active at night to avoid heat of the day
- Burrowing

- Stays underground during the day to avoid heat
- Large ears
 - To lose body heat
- Highly efficient kidneys
 - Produces concentrated acidic urine + dry droppings to avoid losing water
- Light colour fur
 - to reflect heat
- Thick fur/ tough soles on their feet
 - To protect them from hot sand

© Xingzhi Lu 2024

Yasuni Biosphere Reserve

2023年11月1日 17:25

Basic information

- Location
 - Amazon rainforest in eastern Ecuador
- Area
 - 30,000km²

Biodiversity

- One of most biodiverse places in the world
- 1,350 species of animals and 2,700 species of plants
- 800 species of fish, including piranhas
- 350 Species of reptiles, including anacondas
- 300 species of mammals, including jaguars
- Thousands of species of plants and trees including mahogany + teak

Native population

- Two small tribes of people live in deliberate isolation within the borders of the Yasuni National Park
- Their rights – including the right to be left alone – are protected by Ecuador's law

Deforestation in Ecuadorean rainforest

- Ecuador has highest rate of deforestation in South America
- Primary rainforests now cover less than 15% of the country

Reasons for deforestation

- Drilling for oil
 - TNCs like Texaco
 - Access roads build to oil fields
- Logging + agriculture
 - Most deforestation for logging + agriculture happens along the access roads to the oil fields
- Illegal hunting
 - The oil roads allow for increased access to the forest

Local impacts of deforestation:

- Oil spills + contamination
 - In the 25 years that Texaco have operated in the Amazonian region of Ecuador, the oil company has spilled 17 million gallons of crude oil into the local river systems
 - The oil pipelines rust in the hot + wet climate which causes oil leaks
 - They also dumped 20 billion gallons of toxic waste
 - Poisons the soil + plants
 - Animals eating the plants or drinking contaminated water are poisoned
- Loss of biodiversity and threat of extinction of some species
 - Loss of habitats when the trees are cut down and the poisonous waste cause loss of species
 - This interrupts the food chain and can cause other species to be lost and even go extinct
- Degradation of the soil
 - The soil along the access roads are exposed to the heavy convectional rainfall + eroded into the rivers
 - Soil become less fertile
- Social conflicts with native tribes
 - The tribes try to defend their land and protect the forest
 - There have been violent conflicts between tribes and oil companies

Mojave desert

2023年11月1日 17:24

Location

- 125,000km²
- Boundary of FOUR US states including Nevada, Arizona and California
- Latitude 35° N of the equator in SW USA
- To the east of the Sierra Nevada mountain range
- Cold Californian ocean current flows along the western US coastline.

Climate

- Low annual rainfall (160mm) / arid
 - Latitude
 - Located around 35 N of the equator in SW USA
 - In descending arm of the Hadley Cell so air is sinking
 - Air warms up + limited condensation can take place
 - Rain shadow
 - Located in leeward side of Sierra Nevada mountain range
 - Air is sinking, warms up + limited condensation takes places
 - Cold ocean current
 - Cold Californian ocean current flows southwards along the western US coastline
 - Water forced to condense over the ocean surface so air lacks moisture
- High maximum monthly temperature (28°C in July)
 - July = summer in northern hemisphere
 - Sun is overhead + solar radiation is concentrated on smaller area of land
- Low minimum monthly temperature (8°C in January)
 - January = winter in northern hemisphere
 - Sun is lower in the sky and solar radiation comes in more at an angle + spread out
- High annual temperature range (20°C)
 - Position of the sun in the sky changes seasonally
- Extremely cold winters
 - Temperatures can go below freezing (0°C) and any precipitation falls as snow
 - The Mojave is a high altitude plateau (800m above sea level)
 - Temperatures are lower at higher altitudes
- High diurnal temperature range (15-25°C)
 - Due to low humidity + cloudless skies
 - No cloud to absorb escaping heat at night so deserts are cold at night

Plants + animals

- Mojave desert animals
 - Mojave Ground squirrel
 - Black tailed Jack rabbit
- Mojave desert plants
 - Cactus called Joshua tree
 - A shrub called creosote

Human activity in the Mojave Desert

- Mining
 - In the past it was used for mining
 - The Vulcan mine was the largest mining operation which supplied iron for World War 2
 - It is now closed but the scar on the landscape created by the mine can still be seen
- Military
 - Used for military bases with training facilities to prepare soldier

- It is seen as a remote location where training can take place in secret
- Roads
 - Built to provide access for these mines + military bases
 - These opened up access for the other human activities
 - Route 66
 - One of the most important roads in the USA for transporting people and materials across the country
 - It links Chicago (in the east) and Los Angeles (in the west)
 - It runs through the Mojave desert and this increased the population growth and economic development of the desert towns e.g. Ludlow
- Agriculture
 - Extensive cattle ranching
 - Farmers graze cows on the fragile desert vegetation
- Tourism
 - The desert is located between the large cities of Los Angeles and Las Vegas and within one day drive for 40 million people
 - It is a tourist destination with four national parks located in the desert
 - Route 66 helped to increase the number of tourists who could visit the desert
 - Many tourists use off road vehicles and drive around the remote desert
- Energy production
 - Solar energy farms use the reliable hours of sunshine to produce electricity
 - The largest solar farm in the world is located in the Mojave Desert with 200,000 mirrors producing energy for 150,000 homes

Problems caused by human activity

- Population growth
 - Put pressure on the limited water resources
 - Water is being extracted from underground faster than is being replaced by rainfall
 - Causing underground water supplies to dry up.
- Overgrazing by cattle ranching
 - The most edible plants have been over grazed by the cattle causing disruption to the natural food chains
- Pollution
 - Some underground water sources has been polluted by the mining operations
- Tourism + off road vehicles
 - The wheels crush the fragile vegetation and animals burrowed in the sand for protection from the heat
 - The vehicles also compact the desert soils which means that when it rains the water runs off the hard surface, eroding the thin soils

Development indicators

2022年11月15日 20:06

Keywords

- <https://quizlet.com/cn/728668079/flash-cards/>
- <https://quizlet.com/cn/857577911/flash-cards/>

HDI

- A composite indicator
- Scores a country between 0 and 1
- Looks at:
 - GNI per capita
 - Life expectancy
 - Literacy rates and years of schooling
- Measures both economic and social development
- The level of development between different countries can be compared
- Changes in development of a country over time can be measured
- 4 groups: very high, high, medium and low

© Xingzhi Lu 2024

Patterns of and reasons for inequality of development.

2022年11月15日 20:06

Patterns in Development

- Western Europe, Northern North America (Canada and USA) and Australasia (Australia and New Zealand) are made up of MEDCs.
- The region with the most LEDCs would be sub-Saharan Africa
- Afghanistan often is often an anomaly in regard to development indicator scores compared to countries surrounding it.

Reasons for differences in development

- Workforce
 - Skilled, healthy and well educated workers can produce high-value goods to sell
- Trade
 - LEDCs sell primary products which have lower value than goods made in MEDCs
 - Trade is impacted by technology
 - Enables raw materials to be processed and made into goods which sell for a higher price
 - Allows more efficient transport of goods which means further destinations become accessible
- Geography
 - Mountainous areas are harder to access
 - Making trade difficult
 - Flat land meanwhile makes building and transport easier.
 - Hazards will damage infrastructure
 - Money is spent on repairing infrastructure rather than investing in businesses
 - Slow or even reverse development
 - Landlocked countries find it harder to import and export bulky goods as they cannot use container ships.
 - Limits the growth of secondary industry.
- History
 - Colonialism
 - Taking natural resources for low prices
 - Limits economic growth
- Politics
 - Political instability
 - Limit improvement to infrastructure
 - Reduce economic growth as businesses find it hard to invest
 - Violence
 - Lead to damage to infrastructure
 - They need to be replaced before trade can continue efficiently
- Population
 - A high proportion of dependents need money and resources to look after them
- Natural resources
 - Some countries have a plentiful supply of natural resources to sell
 - Allowing rapid economic growth

Inequalities of development within a country

- All reasons for between countries

Core and periphery areas

- Core areas
 - Those with human and physical advantages
 - Leading to Government, Industry, Education and Wealth being situated in the same place
 - These areas have more power.

- Periphery areas
 - Hard to get to and rural
 - Primary sector employment such as mining or agriculture will dominate and wages are generally low
- Due to these inequalities people migrate from Periphery to core areas
- Can lead to problems such as overpopulation, limited job opportunities, lack of workforce to utilise natural resources in periphery areas
- Some countries such as Indonesia may provide incentives (such as lower tax, cheaper education etc) to live in periphery areas to reduce these problems

© Xingzhi Lu 2024

Sectors of employment and links to development

2023年11月28日 20:08

Employment sectors

- Primary
 - Employment / job involving taking natural resources from the Earth
 - Some of the raw materials are sold as they are e.g. rice and fish, others provide raw materials
 - e.g. farming, fishing, mining, forestry
- Secondary
 - Employment that manufacture / process raw materials into finished goods
 - Direct use
 - Raw material to a finished product that is sold
 - Indirect use
 - The processed product forms part of another product which is sold
- Tertiary
 - Employment that involve workers providing a service
 - Services may be paid for directly or may be paid for through the government collecting taxes
 - e.g. shop assistant, teacher, doctor, police, fire service
- Quaternary
 - Industries that provide information services such as Information and Communication technology (ICT), consultancy (advice given to businesses) research and development and financial services, involves high technology + innovation + use of computers
 - e.g. software designer, geneticist

High-tech

- Often found in MEDCs
- High-tech products involve researching, making and using silicon chips, computers, and computer-controlled machinery
- High-tech companies have been growing rapidly as advances in SoL = greater demand for technology
- Example of quaternary industry
 - Jobs are often well paid
- High-tech firms locate near to one another due to agglomeration economies
 - Benefits gained from sharing knowledge and skills.
 - e.g. Silicon Valley in the USA.

MEDC employment structure

- e.g. USA
- Large tertiary sector and a small but growing quaternary sector, small primary + secondary sector
- Reasons
 - The high level of technology available means many primary and secondary sector jobs are mechanised meaning fewer people required
 - Numerous products are imported as this is cheaper than domestic production
 - The higher standard of living mean there is more demand for services and technology hence a large tertiary and growing quaternary industry.
 - Running out of raw materials so there are less miners
 - People are highly skilled workers so they prefer higher paid work in tertiary industry

NIC employment structure

- e.g. Brazil
- Have a large secondary industry, some primary and tertiary sector
- Reasons
 - Due to the growth in production of finished goods from industrialization
 - Mechanisation in factories is expensive hence many people need to be employed in factories
 - Lower levels of technology mean that there is still a significant number of people employed in

primary sector employment

- Cheap production cost, such as cheap labour, so TNCs relocate their factories there

LEDC employment structure

- e.g. Nepal
- Have a large primary industry and small secondary + tertiary industry
- Reasons
 - Large primary sector employment due to many people working as subsistence farmers without many mechanised tools
 - Lack of wealth limits technology so both secondary and tertiary sectors are small + farming is labour-intensive
 - Major exports in LEDCs are often foodstuffs and raw materials

Change in employment structure over time

- As countries develop primary sector will decrease due to mechanisation of farming + low skilled labour moving to secondary sector.
- Exports will change from raw materials to finished products as technology increases, so increase in secondary
- Over time natural resources will decrease making their removal more expensive → they will be imported → further decrease in primary sector
- Greater standard of technology allows mechanisation of factory work so secondary sector falls and tertiary + quaternary to begin to grow

Formal / informal economy

- Informal economy
 - Jobs that are not taxed or monitored
 - People may sell craft items or provide simple services like car washing at traffic lights, or shoe shining (mostly self-employed)
 - Part time, low paid, have no legal protection and leave the workers vulnerable to exploitations
 - Not registered with the government
 - Most common in LEDCs
- Formal economy
 - Pay taxes
 - Mostly employed by a company
 - Regular, normal wage + legal protection
 - Officially registered with the government

Globalisation and TNCs

2023年11月28日 20:08

Causes of globalisation

- Increased trade
 - International organisations promote free trade (no tariffs or quotas) → trade easier
 - Trade is important to economic growth so it continues to develop
- Labour costs
 - LEDCs tend to have less laws to do with labour + generally lower costs of living → labour cheaper
 - Companies will move production of goods to LEDCs to take advantage of this (offshoring)
 - Highly skilled labour will cost less in LEDCs than in MEDCs
- Improvements in transport
 - Container ships can carry hundreds of tonnes of goods at a time and faster than in the last century
 - Air freight is another way of taking goods large distances in a relatively short amount of time
 - More countries can trade with each other.
 - Tourist trips and migration occur more often → allow a spread of culture
- Electronic banking
 - Enables money transactions to occur between people great distances apart, making international trade between easier
- Communication technology improvement
 - Electronic communication such as email, SMS, Skype, Facetime and social media mean that communication can occur instantly over great distances.
 - Undersea fibre optic cable connecting continents has allowed this
 - This allows business and cultural information to be quickly shared
 - People can be quickly aware of events happening in different continents.
 - Wide availability of transportable technology (Smart phones) has further increased rapid information sharing

Transnational corporations (TNCs)

- TNC = a large business that operates in multiple countries
 - e.g. McDonalds, Starbucks and Apple.
- Headquarters will be found in MEDCs or the country the business originated from
- Shops may be found wherever there is high demand for the finished product
- Research and design will be found in countries with a strong quaternary sector (MEDCs)
- Factory work will be moved to LEDCs where costs of production are lower (offshoring)
 - They may also be given to a smaller company who specialises in a specific part of production to make production more efficient (outsourcing)

Benefit of globalisation to LEDCs

- Investment
 - Capital (money, buildings) invested in LEDCs by TNCs may start multiplier effect
 - TNCs may pay taxes to the government and the money created by this investment can be spent on improving education, health and infrastructure.
- New skills and training
 - e.g. IT skills and learning a global business language - English
- Job creation
 - Improve standard of living and quality of life.
- TNCs bring foreign currency in
 - Can be spent by LEDCs on essential services and provisions such as schools, hospitals or fuel

Global and MEDC Benefits:

- Lower priced goods

- Global competition in business means that prices are lower for the consumer
 - Because goods and services are produced in a place with a comparative advantage
- Global solutions are possible
 - Increases awareness of events in far-away parts of the world + provide help
 - Countries working in harmony can overcome challenges such as international terrorism, acid rain and disaster relief
- Benefits of rich global culture
 - Lives are enhanced by different foods, music, clothing and ideas
- Global peace
 - There is a suggestion that countries which have strong economic and cultural links are less likely to go to war with each other

Problems for LEDCs

- Unfair balance of trade
 - TNCs from MEDCs get high profits but there is much exploitation of workers
 - Workers often work long hours in poor conditions for very little pay
 - Low safety standards in LEDCs often mean workers are not protected from hazards such as dangerous chemicals
- Leakage
 - Profits are repatriated (sent back to TNC's parent company) and much of it does not benefit the local economy
- Lack of loyalty of TNC
 - As labour prices rise or environmental standards get stricter the TNC is likely to move the factory to a cheaper country with less regulations and exploit that place

Global and MEDC Problems

- Unemployment in industrial areas
 - As MEDC economy becomes post-industrial (industry has gone to LEDCs) many manufacturing jobs are lost
- Loss of cultural identity (homogenisation)
 - As ideas and fashions spread worldwide places may lose their unique culture and individuality
- Spread of unsustainable practices
 - Globalisation encourages greater consumption → more waste such as plastics, more emissions from factories and more release of greenhouse gases from shipping and international transport
 - This threatens the biosphere
- Countries competing
 - Nations may come into conflict with each other as they search new regions of the world for resources (e.g. Arctic)

McDonalds

2023年11月28日 20:08

Background facts

- Founded in 1955
- Headquartered in Chicago, USA.
- Most restaurants (93%) are franchises
- There are regional HQs in Europe and Asia
- There are now 38,000 restaurants in 118 countries
- 69 million people served daily.

Global links

- Standardisation
 - The signs (golden arches) and packaging are standardised globally
 - UK/US company Boxer designed packaging
 - Regional producers such as Huhtamaki (a Finnish based company with production centres in Poland and Belfast) produce the packaging
 - Similar menu around the world, globally recognisable products (e.g. mcflurry)
- Glocalization to tailor their product to the local market
 - E.g. Maharaj Burger in India with no beef since cows are sacred
- Lots of countries take part in production
 - They partner with other global firms for marketing their product
 - e.g. Plexure
 - A New Zealand based app designer creating personalised, targeted advertising.
 - Sourcing menu items from foreign locations
 - Coffee beans from Colombia
 - Beef from Brazil

Positive impacts of McDonalds

- Creates direct job opportunities in different countries
 - A Finnish company Huhtamaki manufactures the packaging in Ireland and Poland for Europe
 - In Brazil 50,000 workers employed in 650 restaurants, mostly under 21 → a key employer for young people
- Provides a market for farmers in lower income countries
 - Export of coffee beans from Ethiopia and Brazil to McDonalds
 - 100% of coffee beans is 'Rainforest Certified'
 - i.e. grown in a way that is not threatening the rainforest
- Train staff in hygiene standards
 - This benefits other food smaller food retailer/restaurants who cannot afford to train staff
 - Can in future years employ people who have previously worked + trained at McDonalds
- Charity
 - McDonalds donates millions of dollars
 - Ronald McDonald charity invests in sustainable development project
 - Giving to Great Ormond Street Hospital
 - Support grass-roots football in the UK
 - Supply football kits for adult and youth teams
- Social action and influence
 - In Brazil it's Instagram to encourage social distancing during the CoVid-19 outbreak

Negative impacts of McDonalds on Brazil

- Exploitation of workers in franchise restaurants
 - Not overseen by McDonalds but by franchise owners
 - Some restaurants have poor working conditions
 - Some workers have few breaks and are made to work overtime without pay

- Environmental damage
 - In the past McDonalds was sued for buying beef from cattle raised on land that had been illegally cleared of rainforest
 - Today, much soya is grown on cleared rainforests to feed the cattle McDonalds uses elsewhere
- Cultural change
 - In Brazil traditional meal-times taken with larger family are changed for 'on the go' meals
 - Traditional foods such as cassava, rice and beans not eaten anymore
 - Traditional ways of preparing foods lost
 - This known as the 'McDonaldization' of culture
- Health impacts
 - Traditional foods such as cassava, rice and beans are changing to high-fat and sugary fast food
 - Childhood obesity increasing
 - This links to heart disease and strokes in later life

© Xingzhi Lu 2024

Agricultural systems

2023年11月29日 9:05

Classification of agriculture

- Specialisation
 - Arable: growing crops
 - Pastoral: rearing animals
 - Mixed: combination of both growing crops and rearing animals
- Economic status
 - Commercial: growing crops or rearing animals for sale
 - Subsistence: crops grown or animals reared to feed the farmers family
- Intensity
 - Intensive: the farm is small in land size but produces a high yield per hectare by using a lot of labour / machines / chemical fertilizers
 - Extensive: large area of land but produces small yield per hectare because the land is not very productive e.g. infertile soil or extreme climate e.g. low rainfall
- Method of using the land
 - Sedentary: the farm is located in one fixed place
 - Nomadic: the farmer moves from one place to another e.g. moving his animals in search of food/water OR shifting cultivation when farmers clear land to create fields but move after 2-3 years to clear another area to farm

Examples of each type of farm

- Commercial pastoral: dairy farming (keeping cows for milk production)
- Commercial arable: plantations growing palm oil/coffee
- Subsistence pastoral: nomadic herders
- Subsistence arable: slash and burn agriculture in Amazon forest
- Extensive arable farming: shifting cultivation in Amazon
- Extensive pastoral: cattle ranching in Mojave
- Intensive arable: rice growing in Asia
- Intensive pastoral: battery chicken farms in UK

Agricultural system parts

- Physical Inputs
 - Natural things which are needed for farming
- Human Inputs
 - Things needed by the farmer which are man-made
- Processes
 - Actions which take place on the farm that turn inputs into outputs
- Outputs
 - Products made through the farming process
 - Often sold
 - Waste also produced
 - e.g. manure can be used as a physical input to fertilise soil

Physical inputs

- Soil (fertile = arable, infertile = pastoral)
- Precipitation
- Solar energy
- Relief
- Animals

Human inputs

- Labour
- Machinery

- Buildings
- (Genetically modified) seed to grow crops
- Animal feed
- Chemical fertilisers / pesticides / herbicides

Processes

- Rearing
 - Caring and support of animals to maturity
- Ploughing
 - Turning over the land and preparing it for planting seeds
- Fertilising
 - Adding chemicals to the soil to try and make it more fertile
- Weeding
 - Removing alien plants from crop fields
- Irrigating
 - Watering the land
- Cultivating
 - To care for and grow crops
- Slaughtering
 - The killing of animals once they have reached maturity and are ready to sell
- Planting
 - Putting seeds into the ground

Outputs

- Profits
- Crops
 - Corn, wheat, etc.
- Animal products
 - Meat products
 - Wool
 - Milk
 - Waste
 - Methane

Use of outputs

- Crops and animal products can be sold for money or used as own's food
- Waste can be used to fertilise the soil

How do physical factors influence the farmers decision

- Climate:
 - Temperature
 - Crops require at least 5 months above 5°C to grow
 - Areas with temperature extremes (semi desert regions like Australia) = pastoral farming (often nomadic in search for water)
 - Precipitation
 - Pastoral farming usually takes place in areas of heavy / low rainfall (too much / less for crops)
 - Areas with moderate rainfall e.g. 600-1000mm per year are suitable for arable farming
 - Amount of sunshine
 - Crops require a certain months with sunshine in order to ripen them for harvest
 - High sunshine = arable, low sunshine = pastoral
 - Growing season
 - The number of months when temperatures are above 5°C so the crops can grow
 - The length of growing season affects how many harvests can take place and the amount of yield
- Relief(the height and steepness of the land)
 - High and steep slopes are usually used for pastoral farming

- It will be difficult to use machines which are required for arable farming
- Steep soils often have thin eroded soils which are infertile and not productive enough to grow crops
 - It is colder + some animals survive better e.g. sheep
- Flat land = easy to use machinery = commercial arable farming
- Soil fertility
 - Deep fertile soil encourages commercial arable farming because it is more productive than thin infertile soils
 - Infertile, only grass supported → pastoral farming

How do human factors influence the farmers decision

- Financial investment (capital or money)
 - Wealthy farmers will invest in machineries, chemical fertilizers, farm buildings to increase their yields = commercial farming
 - Poorer farmers with less money to invest = subsistence farmers
- Labour
 - High inputs of labour are found on intensive farms which produce high yields
 - Low inputs of labour are found on extensive farms e.g. cattle ranching or shifting cultivation where production is low
 - The amount of labour available for the farmer depends on the amount of money a farmer has to pay wages
- Tradition / inertia
 - The cost of growing different crops and keeping different animals varies
 - The investment needed in buildings and machinery can mean that changing the farming activity can be difficult
 - This can lead to farmers staying with the type of farming they know best / family tradition
- Government incentives
 - Some governments use financial incentives to encourage farmers to produce specific crops in order to ensure food security for the people
- Agricultural technology
 - e.g. artificial seeds like GM seeds
 - Some governments will not allow GM crops to be grown due to the risk to the natural environment
 - Farmers can only use these artificial seeds if they can afford them and they are permitted
- Size of farm
 - In some countries the inheritance laws means that land is divided equally between all sons
 - This has reduced farm sizes so that often the farms are too small and can only be used for subsistence farming
 - In general large farms are more efficient at producing food because they can benefit from economies of scale → commercial farming
- Land tenure
 - Some farmers rent land and there are restrictions on what they can use the land to produce
 - Owns the land = can choose type of farming

Problems with commercial farming

- Deforestation to clear land e.g. in Amazon for cattle ranching
- Over use of antibiotics for animals
 - Germs are developing resistance to antibiotics and forming super bugs
- Eutrophication
 - Chemical fertilizers run off into rivers
 - This causes algae to grow on the water surface and block sunlight
 - Kills the river ecosystem
- Animal welfare issues in factory farms
 - Animals are packed together with insufficient light and space
- Global warming
 - Greenhouse gases produced from farming contribute to global warming
 - CO₂ from increased mechanisation

- Methane from cows
- Ice caps melt: sea levels rise and floods low lying countries
- Hedges removed to increase field sizes for machinery
 - Causes loss of habitats + safe green corridor for wild animals

Shifting cultivation in tropical rainforests - farming methods

- Farmers cut down trees using hand tools
- They burn trees to clear the land and the ash is used as a fertiliser
- The heavy tropical rainfall washes nutrients out of the soil into the rivers (which turn red)
- Farmers grow crops on the field for 2-3 years until the land is infertile (2-3 years)
- The farmer then moves on to another area & repeats the process
- The abandoned clearing is left for at least 50 years to regrow
- Food is also obtained through hunting & gathering

Problems with this method

- Deforestation leads to the ground being exposed to heavy tropical rainfall
 - This causes soil erosion and increased flooding so soil becomes infertile
- Loss of habitats for animals & loss of natural biodiversity
- Low yield
 - Low food production so few people can be fed from this type of agriculture
 - Large amount of land required
- The forest is increasingly being cut down for commercial agriculture e.g. coffee and tobacco growing so less land available for subsistence farmers

© Xingzhi Lu 2024

Food shortages

2023年11月29日 9:05

Keywords

Word	Definition
Hunger	Not having enough food to meet energy needs
Malnourished	A person's diet does not provide enough variety of vitamins or minerals which are needed for a person's healthy growth
Undernourished population	% of the people who eat less than minimum calories required

Location of food shortages

- 800 million in LEDC countries undernourished
- Mainly found in sub Saharan African countries but also in parts of Latin America
 - e.g. Haiti
 - A few in Asia e.g. Yemen and Syria

Physical causes of food shortages

- Unreliable rainfall and drought
 - Much of East Africa e.g. Ethiopia + Sudan has periods of low rain + drought
 - Crops fail + do not produce seeds for next year's planting so farmers run out of seeds
 - Animals die of dehydration + lack of feed
- Tropical storms
 - Hit areas like coastal Bangladesh + Haiti with high winds, heavy rain and storm surges
 - The sea floods low lying coastal areas causing salinization (salt) of the soil
 - Destroys farm land and crops
 - Soil becomes infertile
 - Subsistence farmers do not have the resources to recover and return the soil to fertility
- Floods
 - Heavy rainfall will cause rivers to overflow the land and destroy the crops/ drown animals
- Pests and diseases
 - Pests e.g. locusts can destroy crops, plant diseases causes lots of crops to die
 - Farmers lack the money to buy expensive pesticides and cope with these insects

Human causes of food shortages

- Deforestation and overgrazing causes soil erosion
 - Deforestation = forest cleared
 - Overgrazing = farmers keep too many animals and they eat the natural vegetation
 - Removes the natural cover of vegetation
 - The soil is exposed to heavy rainfall which washes the topsoil away
 - The soil loses its nutrients and becomes infertile
- Poverty
 - Farmers do not have the money to invest in improving their farms
 - e.g. through buying chemical fertilizers, pesticides, machines or building irrigation
 - Farmers still use traditional methods which are not so productive
- War
 - Civil war causes people to leave their homes and farms to escape from the fighting
 - This means they cannot produce any food
 - Crops and animals are often destroyed or stolen by the soldiers
- Increasing population
 - Farms are divided into smaller and smaller units amongst the farmer's children until the farms are too small to support the subsistence family
 - Farmers are forced to use more marginal and unproductive land to grow food to feed their

families

- Unstable food prices
 - Food prices increase when there is a poor harvest
 - Even if there is food available, the poorest people cannot afford to buy the food.
- Rise in global food prices
 - Because of increasing demand for food in the last 10 years, global wheat price has doubled and rice price tripled
 - This has caused food shortage amongst the poorest
- Insufficient food aid
 - Aid agencies criticised for not responding fast enough following a disaster

Impacts of hunger

- Economic costs for aid
 - More than \$2 billion spent for food insecure people in the Sahel Belt by the UN
- People starve and may die from lack of food
- People are weakened due to lack of food and may be more likely to die from diseases
 - e.g. scurvy (lack of Vitamin C), rickets (lack of Vitamin D)
- People out migrate from the area in search of food, increasing the number of refugees
 - Refugees put pressure on food and water supplies of neighbouring regions
- Malnutrition for people
 - Malnutrition → cannot work due to poor health → less food produced / lost earnings → less food to eat → more malnourished

Solution to food shortages

- Food aid
 - Supplied by World Food Programme (WFP) to 90 million people a year
 - Also make poor children go to school as food is given out in schools
 - Problems with food aid:
 - Short term solution
 - Encourages dependency
 - Can arrive too late: people already dying
 - Decreases the price of food which is produced locally → farmer get less income
 - Does not solve the causes of food shortages
 - Often involves corruption
 - Not enough for all people that are in food insecurity
- Educate farmers on appropriate technological solutions
 - Contour ploughing
 - Land is ploughed across the slope, following the contour lines of the land
 - This allows rainwater runoff to collect in the furrows and contributes to soil and water conservation
 - Strip farming
 - Planting small strips of crops, which are harvested at different points of the year
 - Taller crops protect areas downwind from wind erosion and the variety of crops mean no one type of nutrient is exhausted
 - Terrace farming
 - Create small patches of flat land in hilly areas
 - This is achieved by building small steps into the side of a mountain to prevent mudflows, and reduce soil erosion, while conserving nutrients
 - Crop rotation
 - Alternating crops that require lots of nutrients from the soil with those that add nutrients into the soil
 - Drought resistant plants
 - Grow crops or trees that require little water to survive (seeds can be given to farmers free)
 - e.g. acacia tree
 - Can provide feed for animals, adds nutrients to the soil and its gum can be sold in the market for money to buy food

- Bunds
 - Building a low wall of mud/stone on gently sloping land
 - This traps water behind it and stops soil being carried downslope
 - Thus a deeper and more moist soil is created immediately behind the wall, allowing larger plants like fruit trees to be grown.
- Mulching
 - Covering the soil in dead organic matter such as hay or leaves
 - Reduce evaporation losses, meaning soil is more moist and less likely to be eroded by the wind
- Planting high yield varieties
 - e.g. IR8 is an HYV of rice
- Large scale solutions
 - Great Green Wall
 - A tree planting project that is aiming to be 8000km long, 15km wide, across the Sahel region of Africa
 - Aim is to reduce desertification by tree roots holding the soil in place and trapping moisture in the soil → there is more good soil for growing crops
 - It also involves small scale sustainable farming methods used in between the trees, such as bund farming, mulching, drought resistant plants etc.
 - Green revolution
 - Intensification of farming originally in India via USAID investing in infrastructure, and TNCs such as Ford providing machinery (e.g. diesel pumps for irrigation) and research from the Rockefeller centre to produce high yield rice (IR8) and wheat varieties

© Xingzhi Lu 2024

Industrial systems

2023年11月29日 9:05

Classifying industries

- Primary industry
 - Extract raw materials e.g. mining, agriculture, fishing and forestry
- Secondary industry
 - Process and manufacture products using the raw materials from primary industry e.g. iron + steel, food processing
- Tertiary industry
 - Provide a service e.g. education, retail (shops), office work, transport
- Quaternary industry
 - Information technology industry e.g. microelectronics

Employment structure

- The % employed in each sector
- Primary sector
 - Decreases over time
 - Mechanisation of farms reduces need for farm workers.
 - Raw materials run out leading to loss of mining jobs
 - Rural depopulation because people prefer the better paid and less physically demanding jobs in the cities
- Secondary sector
 - Increases at first but then decreases
 - Industrialisation needs a large workforce in factories
 - But factory jobs eventually replaced by automation causing decline in secondary employment
 - Manufacturing industries increasingly move from MEDCs to NICs where land and labour are cheaper.
- Tertiary sector
 - Increases over time
 - Large and growing informal service sector in urban areas of LEDCs as workers migrate from the countryside
 - As a country develops, demand grows for industrial services e.g. banks and also government services such as health + education
 - Strong growth in MEDCs of jobs in the knowledge economy

Formal and informal employment

- Formal employment
 - Official jobs where the worker is registered with the government, pays tax and has the legal protection
 - Workers receive a regular weekly or monthly wage
- Informal employment
 - Part time, temporary jobs which do not pay tax and have no job security, not registered with the government
 - They are usually low paid
 - Found in LEDCs e.g. street sellers, shoe shiners or farm workers

Industrial system

- Inputs
 - Physical inputs: natural things needed to set up a factory
 - Raw materials
 - Flat land
 - Energy (electricity or fossil fuel)
 - Water supply e.g. river

- Human inputs: man-made things needed to set up a factory
 - Transport
 - Labour
 - Capital (money)
 - Government policies
 - Market
- Processes
 - Actions completed in a factory to change raw materials into products
 - Processing of raw materials
 - Assembling components
 - Packaging
 - Transporting/distributing
 - Selling
- Outputs
 - Things that a factory produces either to sell or as a by-product
 - Finished products
 - Profits
 - Waste
 - Pollution
- Feedback to the inputs
 - Profits
 - Knowledge
 - R&D

Physical factors that influence industrial location

- Access to raw materials
 - Heavy or large raw materials e.g. coal are expensive to transport
 - Factories using these raw materials locate close to where the raw materials are found or where they can be easily transported to e.g. a port
- Cheap flat land
 - Factories need large areas of flat land e.g. river or coastal plain as it is easy to build on
 - The land needs to be cheap and have space for any future expansion of the factory
- Easy transport routes
 - Natural transport routes e.g. rivers attract industry (airport for hi-tech industry)
- Water source
 - Cooling and washing machines
 - e.g. river (fresh water preferred)
- Access to cheap energy sources (* not for light or hi-tech)
 - Industries using coal as the source of energy locate near coal fields because it is heavy to transport
 - If electricity is energy source then the industry is footloose because electricity is easily transported by the national grid → not a locational factor for light industry
- Hi-tech only: attractive environment
 - To attract skilled workers to live and work there

Human factors that influence industrial location

- Availability of labour
 - Heavy = large, semi-skilled labour force
 - Light = large, semi-skilled or skilled labour force
 - Hi-tech = skilled labour force
- A market to sell the products
 - To reduce transport costs because the product is heavy e.g. drinks
 - Product might be perishable e.g. food products like milk or has a short life span e.g. newspapers
- Government policies
 - Industries may be attracted to certain regions by lower taxes, lower rents, improved transport links and cheap loans offered by governments and the EU because these areas have high

unemployment e.g. South Wales

- Economies of scale
 - All parts of the processing are located in one large factory
 - It should make more profit than many smaller ones by sharing some of the costs e.g. by buying in bulk
 - Light industry = components produced nearby to reduce transportation cost
 - Hi-tech = near universities and other hi-tech businesses to share R&D costs
- Technological development
 - Internet + video conferencing = many IT industries do not need to be in offices + people can work from home
 - Some service industries e.g. banks have moved their offices from expensive MEDCs to LEDCs e.g. India where labour costs are lower
- Capitals for investment

Reasons why businesses move

- Raw materials exhausted
 - The raw materials that the industry used has run out or is too expensive to be extracted
- Fall in demand for product
 - Consumers no longer buy the product because it is out-dated
 - The factory closes
- Mechanisation
 - Workers replaced by machines e.g. robots in car industry
- Increases in production costs
 - A rise in wages, transport costs or costs of raw materials
 - The factory close and move to another region or country where production costs are cheaper
- Foreign competition
 - Imports from countries with cheaper production costs can undercut the price of home products
 - The factories cannot compete and close

Reasons for factories not moving even if some locational factors are gone

- Inertia
 - Easier to remain there than moving
- High cost to relocate
- Skilled labour force in the factory
 - Expensive to train workers elsewhere
- Reputation of the area for producing that product
- Transport links on coast e.g. port
 - Raw materials can be imported so no need to relocate

Characteristics

- Set up in the last 25 years and produce high value products e.g. computers
- Use advanced manufacturing techniques e.g. using micro-electronics
- Employ highly skilled workers & carry out a lot of research and development (R and D)
- Normally footloose (link to reasons below)

Footloose industries

- An industry that is not dependent on locational factors because:
 - They use small component parts which are not heavy to transport
 - Their finished product is small and light so cheap to transport
 - They use electricity as their energy source
 - They need a small labour force
 - They are non-polluting and can locate near houses

Business and science parks

- Science Parks = modern industrial sites where hi tech industry is grouped together
- Found on the edge of towns / cities which have universities

- Surrounded by countryside and have modern buildings built in landscaped gardens/parkland
- Room for expansion

Reasons for locating in science parks

- Near universities to benefit from research facilities and ideas from academics
- Near other hi tech industries to exchange ideas
- The small companies can share costs of maintenance and administration
- Pleasant living and working environments to attract skilled workers
- Good transportation and communication networks e.g. near international airports and motorways

© Xingzhi Lu 2024

Tourism

2023年11月29日 9:05

Tourist definition

- Tourist
 - Tourists are people who travel and stay away from their home for at least one night for leisure, business or other purposes e.g. visiting friends and relatives
- Domestic tourist
 - A person who travels within their own country
- International tourist
 - A person who travels to another country

Global tourism situation

- An important and rapidly growing industry
- Over 1 billion tourists a year + tourist income estimated to be worth \$900 billion + 7% global employment
- Rapid increase in international tourist numbers in the last 50 years from less than 100 million to over 1 billion with an annual growth rate of 4%
- Europe is most important international destination with over half the international arrivals
- Americas and East Asia / SE Asia have 1/3 of international tourists

Reason for growth in tourism number

- Rise in disposable incomes
 - So people have more money to spend on leisure
- Increased leisure time
 - Because there are more paid holidays and increasing number of retired people with pensions to spend on leisure
- Flying is more affordable
 - Because of budget airlines e.g. Easy Jet
 - Technological development in flying has meant that planes are larger and more fuel efficient so the cost of each flight per passenger is less
- Cheaper holidays
 - Introduction of package holidays where one price pays for the transport + hotel has reduced cost of foreign holidays
 - Also there is more competition between travel companies
- Media coverage
 - Increasingly the TV, internet etc
 - Advertises different holiday destinations
- Increased international migration
 - This has rapidly increased the number of people visiting friends and relatives

Physical factors that encourage tourism

- Suitable climate e.g. hot/dry climate with long hours of sunshine for summer holiday or reliable snowfall for winter sports activity holidays
- Attractive coast with sandy beaches/warm sea for water sports
- Attractive / beautiful scenery with spectacular views or biodiversity for nature holidays
- Mountainous environment for hiking / walking holidays

Human factors that encourage tourism

- Developed transport network e.g. roads, rail or airport so access is easy
- Politically safe country e.g. low crime rates + no war
- Places of historic importance e.g. ancient buildings, sites where specific events took place
- Places with cultural importance e.g. centres of religious importance or with museums / art galleries

- Socially interesting e.g. good food, music, dance etc.
- Developed tourism infrastructure e.g. hotels, resorts, theme parks

Positive economic impacts of tourism

- Creation of jobs which will increase household incomes
 - Jobs can be direct e.g. tour guide OR indirect e.g. farmer
 - Most jobs are labour intensive
- Increased taxes paid by both local + tourist businesses
 - Govt. can use this money to invest in infrastructure e.g. transport, education + health
- Increase in foreign exchange
 - e.g. US\$ to help pay for imports from abroad
- Cumulative causation will help to attract further economic development of the area

Negative economic impacts of tourism

- Mainly seasonal jobs
 - Unemployment during off season
- Jobs are often low skilled + low paid
- Economy can become dependent on tourism
 - Risky business because tourist numbers can fall dramatically due to natural disaster or a political event e.g. terrorist attack
- Leakage
 - Hotels and travel companies are often owned by international companies who send their profits back to their own country
 - Local economy does not gain from this

Positive social impacts

- Increased understanding between cultures
- Increased language skills
- Preservation of historic sites + culture e.g. dance
- Improved social services for locals e.g. education + health care if govt. invests tourist taxes in these so living standards improve

Negative social impacts

- People are displaced (forced to move) from their homes so their land can be used to build hotels
- Traditional way of life may be abandoned as people copy the tourist culture in terms of their clothes, food, behaviour
- More crime due to prostitution, drugs, alcohol
- Young people leave family farms to go + work in tourist industry which earns more money. This leaves more elderly people in the rural areas

Positive environmental impacts

- Tourism money can be used to protect the environment e.g. money paid to enter national parks or a tourist tax

Negative environmental impacts

- Over use of water for hotels + swimming pools can cause water shortages
- Air travel creates more CO₂ which contributes to climate change
- Litter/waste pollutes land + can poison wildlife
- Water pollution from motorboats + sewage can pollute sea water which damages marine wildlife
- Golf courses require a lot of water for irrigation + use fertilizers which run off into rivers + cause eutrophication
- Deforestation + habitat destruction to clear space to build hotels + transport networks

Sustainable tourism

- Tourism is organised so that it will not cause damage to the economy, living conditions of the local people or the environment
- This means that the tourist development should provide jobs for locals, increase people's living

standards and protect the natural environment.

Types of sustainable development

- Ecotourism
 - A specialist type of tourism where people experience untouched natural environments e.g. tropical forests + remote mountain areas
 - They do not damage the environment because they are small scale, use local building materials, use renewable energy, control waste disposal + educate tourists on how to behave to minimise their impact on local culture + environment
- Tourist hubs
 - Concentrate tourism in a specific location so that the negative impacts are only found in one area
 - The majority of the area is therefore protected from damage
 - e.g. tourists encouraged to go to the hub by building car park + facilities there
- Protected areas
 - Areas have protected status so that any tourist development is restricted
 - Preservation: maintain the location exactly as it is. No development allowed
 - Conservation: development is allowed but it must not damage the character of the place
 - Example: World Heritage sites + National Parks e.g. Yellowstone, USA or Wilderness Areas (the highest standard of protection) e.g. Denali NP in Alaska There are two ways to protect these areas:
- Quotas
 - A limited number of tourists are allowed to visit the place each year
 - This allows some jobs to be created for the locals / supports the local economy but reduces the impact of the tourists on the environment
 - e.g. Antarctica: limited to ships with less than 500 passengers, only 100 people ashore at one time

Adney Farm, Shropshire, UK

2023年11月29日 9:05

Location

- 2km SE of Shrewsbury
- Near Attingham Park National Trust property

Natural inputs (relief, climate and soil)

- 2.2km² flat land
- Fertile alluvial soil from flooding of River Severn
- Temperate climate
- Rainfall: moderate rainfall 700mm per year, rains throughout the year with about 60mm per month
- Temperatures: warm summer average 16°C, only 3 months of the year average below 5°C so a 9 month growing season

Human inputs (economic, people and machines/ICT)

- Capital intensive
- Low labour input: most work done by farmer
- High tech machinery e.g. tractor with on board technology using GPS for accurate planting
- Chemical fertilizers and pesticides used to maximise yield
- Large area of barns for storage

The outputs of the farm

- Winter wheat for animal feed
- Summer wheat for cereal production
- Wheats sold to a merchant
- Oil seed rape for biofuels and cooking oils
- Cattle raised to sell bulls for dairy farm breeding (currently own 38 cows and their calves), calves sold to dairy farm for breeding
- Manure from animal waste to fertilise the soil

Reasons for different land use on the farm

- Arable farming on land owned by the farmer
 - Located next to the River Severn on the flat, alluvium deposition fertilise the soil
 - Flat land + fertile soil = commercial arable farming, good for using machineries
 - Wheat + oil seed rape in rotation
 - Oil seed rape = high output rotation crop
 - An important crop for intensive arable farmers, as it can provide a good income and goes well in a rotation with wheat (a profitable cereal crop) as it helps to fertilise the soil
 - Wheat earns most profit
- Pastoral farming on land rented from the National Trust
 - Owns 38 cows
 - They have a rule that their land must be left as grassland
- Reasons for mixed farm
 - Allows farmer to spread the risk in case there are changes in prices of crops and weather impacting on his crop yields
 - Also it spread out the work load
 - Manure from animal waste fertilise the soil
 - Winter wheat to feed the cows

Darfur, Sudan

2023年11月29日 20:41

Physical causes of hunger

- Low rainfall, only 400mm per year
- Seasonal rainfall with long dry period → difficult to grow crops + feed / water animals, short growing season
- Heavy rainfall in wet season → flood roads and prevents transportation of food
- Increased use of marginal land for agriculture → not productive enough to support the population
- Periodic drought when wet season fails to arrive → crops fail and animals die

Human causes of hunger

- Conflict
 - Started in 2003 and continues today
 - Caused by disagreement between people of Darfur (predominantly African) and government in Khartoum (predominantly Arab) over sharing of resources
- Crops / animals stolen and destroyed by rebels during the conflict
- Difficult to transport food into the conflict zone
- Farmers cannot plant crops due to the insecurity and fighting, people fleeing to other regions
- Refugees flee to Chad (200,000 live in refugee camps) so there is now pressure on food supplies in Chad

Impacts of food shortages

- On Darfur
 - Increased malnutrition, especially in children
 - Leading to stunted growth
 - Increased levels of starvation and famine
 - Estimated 2 million people displaced
 - They move to cities in Darfur or out-migrate to Chad and live in refugee camps often for years
 - Very poor conditions in camps
 - Overcrowded, limited food, lack of water in arid location
 - Poor sanitation and diseases spread
 - Dependent on food aid from United Nations World Food Programme (WFP)
- On Chad
 - 200,000 refugees live on border with Darfur
 - Pressure on local food supplies in the border region
 - Need to feed local population + refugees
 - Pressure on water supplies
 - In area with low rainfall and drought as well
 - Local population are afraid that the conflict will spread into Chad
 - Local population concerned that diseases will be brought with the refugees
 - e.g. measles

Bangalore, India

2024年1月17日 12:43

Basic information

- Located in Southern India on the Deccan plateau
- Called the Silicon Valley of India
- Many TNC hi-tech companies locate there e.g. Microsoft, Google, Samsung and Texas Instruments

Reasons for the growth of hi-tech industry

- Physical Geography
 - Located on high Deccan Plateau
 - Creates pleasant climate : often called the Garden City
 - This makes it a good place to live which is important for attracting skilled workers.
- Government support
 - Government investment
 - Government set up hi-tech industries in the city e.g. India Space Research Organisation
 - This caused the multiplier effect which means other hi tech companies located there to provide services for these government tech industries
 - Government incentives
 - To encourage investment, the government identified the city as a Special Economic Zone
 - Businesses can set up there with lower taxation and regulations
 - Science and IT parks set up
 - e.g. Electronic City
 - Smaller business can benefit from agglomeration economies
 - Agglomeration economy = smaller hi-tech firms group together so they can share the cost of services e.g. administration and therefore reduce costs
- Human factors
 - English is widely spoken
 - Historically it was a site for British military offices and so people learned English
 - Workers
 - 8.5 million people live in the city so there are a large number of workers living nearby
 - Labour costs are cheaper in India than in Europe or USA and willing to work unsociable hours
 - University
 - There are over 20 universities located in the city which can supply skilled labour + provide research and development facilities

Philips Innovation Centre (PIC)

- Located in Manayata Tech Park in Bangalore, India
- Key software for Philips products is researched and designed there
- Flat land input = helpful for building PIC, allowing large number of computers to be installed on → the process of coding software occurs on computer → make software e.g. software for MRI scanners with advanced molecular imagery
- Skilled labour = supplied by the nearby Bangalore university, 2500 workers hired → research and design products so they are safe and easy to use → high quality app made and can then be sold, e.g. air purifier app which allows control of an air purifier from mobile phone
- Good internet connections provided by fibre optics cabling paid by the government → allows good internet speeds for designing and researching as well as communicating with other companies → allow easy sale of apps
- Profits made provide capital for investment to improve the inputs

Dubai, UAE

2024年1月17日 12:43

Location

- Dubai is one of the 7 Emirates in the United Arab Emirates
- Located in the Middle East on the Persian Gulf

Basic information

- Population 2.8 million people (small)
- Sparsely populated desert region
- Most people are Arab and both English and Arabic is spoken widely
- Main religion is Muslim
- Developed country with high GNI per capita of \$25,000
- Economy based on export of oil and natural gas and tertiary industry particularly tourism, retail and trade
- Socially developed e.g. life expectancy 78 years
- HDI: 0.84, ranked 41st in the world

Overview of tourism in Dubai

- 9 million people visited in 2015 worth \$4 billion
- Tourist numbers increasing by 10% per year (global average is 4%)
- Earns \$4 billion a year which is 25% of Dubai's GDP

Physical tourist attractions

- Geographical location being equally distant between Europe and Asia
 - Used as a stop off point between these continents
- Hot climate averages 30°C
- Guaranteed sunshine all year round
- Dry climate with less than 160mm of rainfall a year
- Excellent destination for winter break from cold European winter with temperatures around 20°C in December to March
- Attractive desert environment with opportunities to camp out in the desert
- Located on coast with warm Persian Gulf Sea

Human tourist attractions

- Easily accessible from Europe by air with 120 airlines flying there including the national airline Emirates
- Major hotel developments including 6* hotels e.g. Burj al Arab
- Highly developed tourism infrastructure and leisure facilities including golf courses, ski dome and water parks
- High end shopping malls with tax free shopping
- Traditional culture: opportunities to see historic buildings e.g. mosques and spend time in desert with traditional people

Economic impacts of tourism

- Increased direct employment opportunities in hospitality and entertainment industries
- Increased foreign direct investment (FDI) for example international hotel chains and entertainment companies investing in the rapid development of Dubai
- There have been major hotel developments in Dubai which widely include the Palm, Dubai Tower, Burj al Arab hotel
- Infrastructure developments for tourism create indirect employment in construction e.g. currently over 100 tourism and leisure projects are underway
- Tourism sector accounts for almost a quarter of the Emirate's annual GDP.
- Dubai Airport is 7th busiest in the world for passenger numbers indicating the economic importance

of tourist industry

Social impacts of tourism

- Domestic community can mix with individuals from the different nationalities
- Wide range of cultural and social events available for domestic people which include exhibitions, entertainment etc.
- Enhanced facilities for sports and leisure developed for the tourists which might be in use by domestic people

Environmental impacts of tourism

- Extensive use of air conditioning
 - Tourists can cope with the hot temperature in summer uses a lot of electricity (produced by burning fossil fuels, mainly oil) and water
- Lack of water means they use desalinated water to produce fresh water
 - This uses a lot of fossil fuel energy in the process and creates a concentrated saline waste which is deposited in the sea and pollutes the sea
- Fresh water is abundantly used to irrigate golf courses, gardens and swimming pools
 - A waste of the precious resource in the desert environment
- Reclamation of land to create developments
 - e.g. The World, the Palms
 - Causing environmental damage to the marine ecosystem
 - Sediment being deposited on coral reefs which are destroyed + stagnant water in some areas causing algal bloom
- Quad biking in the desert region
 - Damaging fragile desert ecosystem as the plants are crushed
- Flying to Dubai
 - Increased the amount of CO₂ produced from burning jet fuel

Al Maha

- 225km² desert conservation area with a tourist resort at the centre
- Social
 - Built using traditional Arab architectural style and traditional artworks and paintings are used to decorate the resort
 - Low rise + designed to blend in with the shape of dunes so no visual pollution
 - 2000 rare cultural items used
 - Some traditional crafts can be bought in the shop
 - Helps to preserve the culture / traditions of the local people
- Economic
 - High end tourism with 37 large hotel suites which are located in an attractive location in the reserve
 - Serving international food and offering spa treatments
 - This means that the hotel will generate a high income and create job opportunities (directly through hotel employees and indirectly through the construction of the resort)
- Environment
 - Money earned from tourism is used to protect the natural environment and wildlife park which include 33 indigenous (local) animals including the Arabian oryx and 100 bird species
 - Nature reserve created around it
 - Planted 6000 tree species
 - Number of oryx increased from 100 to 400
 - All waste are disposed carefully and recycled
 - Tourists are educated about the importance of protecting nature

Energy mix

2024年2月19日 18:57

Keywords

- <https://quizlet.com/cn/884351942/flash-cards/>

Thermal power plant

- Water is heated in a boiler to produce high pressure steam
- Fossil fuel burned to produce heat / uranium atoms release heat energy by nuclear fission
- Generators are turned by the turbines blown round by the steam to generate electricity

Renewable energy sources

- Hydroelectric power
 - Rivers are dammed to create a reservoir
 - Water flows through channels in the dam and turns the turbines which create electricity in the power house
- Geothermal energy
 - In areas where the magma is close to the earth's surface
 - Water can be pumped underground → water turn to steam and the power of the steam is used to turn the turbines to produce electricity
 - The heated water can be used to heat homes in radiators
- Wind power
 - Wind energy is converted into electricity using wind turbines
- Solar energy
 - Photovoltaic cells convert sunlight into electricity
- Biofuel
 - Some plant material can be converted in liquid or gas fuels which can be used to power vehicles
 - e.g. sugar cane is converted into ethanol and oil palm can be processed to produce biodiesel
- Fuelwood
 - 3 billion people worldwide rely on wood for cooking and heating
 - This is considered renewable only if trees are being replanted

Global energy mix

- Fossil fuels: 87%
 - The world relies on fossil fuels for their energy needs
 - Oil 38%, coal 26%, natural gas: 23%
- Nuclear energy: 6%
- HEP: about 6%
- Other renewables: less than 1%

Reasons for variation of energy mix

- Level of development
 - MEDCs
 - High energy demands so they use a lot of fossil fuels which are efficient at creating electricity
 - Also they have high car ownership so a lot of oil is used for petrol
 - LEDCs
 - The energy demand is low and many people cannot afford to pay for electricity so the main energy source is fuelwood
- Physical environment
 - Countries with hot/dry climate e.g. Spain use more solar power
 - Countries which have reliable wind e.g. UK use wind power
 - Iceland uses geothermal because it is located on a plate boundary

- Environmental concerns
 - Some countries (MEDCs) choose to reduce their use of fossil fuels which are blamed for releasing carbon dioxide and causing global warming
 - They use nuclear power e.g. France or renewables to supply their energy e.g. Norway: 96% electricity from HEP

Problems with lack of electricity

- Cannot access light and electronics
- Collecting fuel wood causes deforestation
- Collecting fuel woods is a unproductive use of time, children miss out education, cause health + growth problems
- Burning fuel wood cause people to inhale particulate matters and cause respiratory diseases
- Prevents TNCs from building factories in the country as there is no electricity for factories

© Xingzhi Lu 2024

Nuclear + renewable energy sources

2024年2月19日 19:12

Nuclear and non-renewable energy resources comparison

Energy source	Advantages	Disadvantages
Fossil fuels	<ul style="list-style-type: none"> • Highly efficient at producing electricity • Oil is very efficient for powering transport e.g. car, planes • Technology for using them to produce energy is highly developed 	<ul style="list-style-type: none"> • Finite <ul style="list-style-type: none"> • Coal = 120 year supply • Oil + gas = about 60 years based on known reserves + current technology for extraction • Humans are using oil at a faster rate than finding new oil reserves • Environmental damage <ul style="list-style-type: none"> • Oil spills + deforestation to access oil + coal • Climate change <ul style="list-style-type: none"> • Burning fossil fuels produces CO₂ which is responsible for the Enhanced Greenhouse Effect / global warming • Ice caps melt + sea level rise
Nuclear power	<ul style="list-style-type: none"> • Cheap to run + reliable + highly efficient electricity source • Uranium reserves will last 1000s of years • No carbon dioxide emissions so it is considered a clean form of energy 	<ul style="list-style-type: none"> • Expensive to build / shut down power stations • Nuclear accidents release radioactive material which is poisonous for humans e.g. Japan 2011 after tsunami • Nuclear waste is poisonous and is a risk to people's health (causing cancer) if not disposed of carefully. It remains radioactive for thousands of years • Nuclear technology is restricted because it can be used to develop weapons. International laws limit the number of countries who are permitted to use this type of energy.

Location of thermal power stations

- Near source of raw materials e.g. near a coal mine or at a port to import the fossil fuel
- Next to river to provide a source of fresh water to produce the steam and cool the machines
- Large area of flat land with room for expansion
- Labour: near a settlement to provide the workers
- Not within a settlement (in open space) to avoid people protesting about the building of the power station because it is unsightly, noisy and causes pollution

Location of nuclear power stations

- Large source of water for cooling the reactor which is often sea water (coastal location)
- Coastal location for the safe transportation of nuclear waste
- Hard rock to build a solid foundation and ideally not in an earthquake zone
- Isolated area away from large centres of population for safety from risk of radiation leaking and to avoid protests when it is being constructed
- Labour: near a small settlement to provide the workers required

Renewable energy sources

Energy source	Advantages	Disadvantages
HEP	<ul style="list-style-type: none"> • Low running cost • Most efficient renewable energy source for electricity production • Technology fully developed 	<ul style="list-style-type: none"> • Expensive to build • Land flooded behind dam → loss of natural habitats and people displaced • Dams may collapse and cause devastating

	<ul style="list-style-type: none"> • Dams help control flooding and reservoirs provide water storage for domestic use and irrigation of farmland • Reservoirs can be used for recreational use / tourism / fishing 	<p>floods</p> <ul style="list-style-type: none"> • Droughts result in not enough water to create electricity
<p>Climate based renewables e.g. wind / solar</p>	<ul style="list-style-type: none"> • Renewable and pollution free • Cheap once the turbines or photovoltaic cells installed • Can be used in isolated areas where it would be too expensive to build a network of electricity lines 	<ul style="list-style-type: none"> • Expensive to set up wind turbines and photovoltaic cells • Weather is not reliable + so electricity supply is not dependable and you need a backup source • Not as efficient at producing electricity as fossil fuels, nuclear or HEP • Technology not fully developed yet – cannot store the electricity so supply is intermittent
<p>Fuelwood</p>	<ul style="list-style-type: none"> • Cheap • Renewable if replanted • Carbon neutral 	<ul style="list-style-type: none"> • Deforestation <ul style="list-style-type: none"> • Demand for fuelwood increases and trees are cut down faster than being planted • Causes habitat destruction • Increased soil erosion / landslides when hillside are cleared • People (mostly women + children) waste hours of time and effort collecting wood <ul style="list-style-type: none"> • Bad for their health + they could be using their time more productively, children miss out school • Health problems e.g. lung disease caused by continuously breathing smoke filled air in homes

Location of hydroelectric power station

- On a river with a large and reliable discharge (flow)
- Steep sided and narrow valley to make it easier to build the dam across the river
- Impermeable rock to provide a solid foundation to build the dam + prevent water leaking
- Sparsely populated area up stream: a large area is flooded to create the reservoir, if it is sparsely populated there are fewer people to move

Water uses and methods of supply

2024年2月19日 23:36

Keywords

<https://quizlet.com/cn/884848474/flash-cards/>

Reservoirs + dams

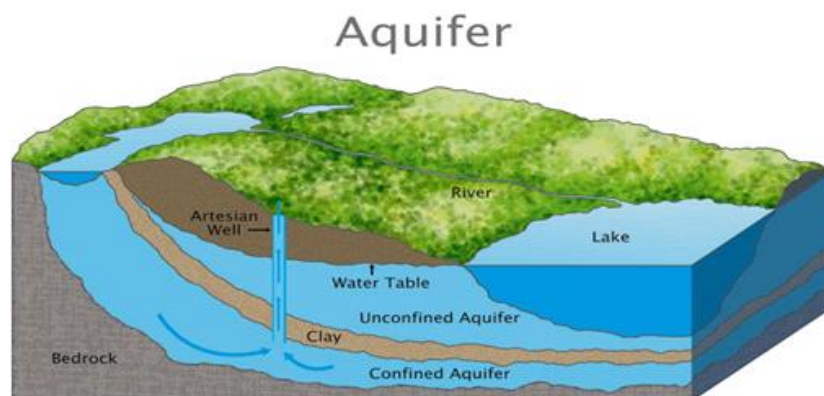
- Rivers are dammed to flood the land behind the dam and create a manmade lake / reservoir
- HEP turbines are often built into the dam so that electricity is produced as well as creating water storage
- Water is transferred to urban or agricultural areas through pipelines

Reservoirs + dams pros and cons

- Advantages
 - Large water supply
 - Constant / reliable supply of water
 - Stores water from the wetter season for drier seasons
 - Multi-purpose scheme: creates hydroelectric power + leisure activities and possible tourism development
- Disadvantages
 - High cost
 - Large area of land flooded upstream → people displaced + habitat destruction
 - Water loss from evaporation during summer

Wells and bore holes

- Drilled into an aquifer below ground
- An aquifer is created when the rock below the surface is permeable e.g. chalk which mean it has pores (holes) or joints (cracks) in the rock and water can collect in these spaces
- The top level of the water is called the water table
- The depth of the water table will vary depending on the amount of rainfall and the amount of water that has been extracted
- Water can be extracted by drilling a bore hole down into the rock below the water table and building a well
- An artesian well can be drilled and water will be forced up due to the pressure gradient
- (+ water pipe take water to people's home)



Wells and bore holes pros and cons

- Advantages
 - Water can be accessed in regions with low rainfall
 - Cheap access to clean water, technology available in LEDCs
- Disadvantages
 - Rainfall may not refill the aquifer if overused so wells / boreholes need to be dug deeper

- Deep aquifer water can be poisonous as it contains minerals e.g. lead

Desalination plants

- Most common method is desalination
 - Heat up water
 - Water evaporates into water vapour but salt left behind
 - Water vapour condenses to fresh water
 - This is used commonly in the Middle East where there is a plentiful source of energy
- This method is expensive using current technology in comparison with normal water sources
 - It requires a large amount of energy to boil the water
 - There are environmental concerns about the disposal of the saline (salt) waste
- Reverse osmosis
 - A pressure gradient created
 - Fresh water move from high to low pressure through a partially permeable membrane as they have smaller molecules
 - Salt molecules is too large to pass through
 - Fresh water is collected in the lower pressure side
- (+ water pipe take water to people's home)

Desalination plants pros and cons

- Advantages
 - Reliable + continuous supply of fresh water
 - Endless supply of salt water
- Disadvantages
 - High cost to build
 - Only available in coastal areas
 - Produces saline waste which damages marine life when disposed in the ocean
 - Requires energy → high cost + create CO₂ emissions

How water is used

- Domestic use
 - In households for drinking, washing and sanitation purposes
 - 10% of global water use
- Industrial use
 - As a raw material, for cleaning + cooling machines
 - 20% of global water use
- Agricultural use
 - For irrigating (watering) the crops when rainfall is not sufficient
 - 70% of global water use

Reasons for variation of water mix

- Level of development
 - LEDCs
 - Use a higher % of their water on agriculture as their economies are focussed on farming and most of their population are subsistence farmers
 - NICs
 - Large proportion on industry due to industrialisation
 - Still a large rural population so a large amount of agricultural use
 - More domestic use as standard of living increases
 - MEDCs
 - Will use a higher % of their water supply on industry because they have a larger industrial sector of the economy
- Climate
 - Countries with low rainfalls (tropical desert environment)
 - May use a higher % of their water supply for agriculture to irrigate their farmland as lots of water lost from evaporation + not enough rainfall for crops
 - Countries with reliable rainfall (temperate)

- May use a lower % of their water supply for agriculture because their farming will be rain fed

© Xingzhi Lu 2024

Water shortages

2024年2月19日 23:39

Water consumption patterns

- Water consumption across the world is not equal
- People in MEDCs consume much more water than those in LEDCs
- 1 billion people are without safe drinking water and 2.5 billion people have no sanitation facilities

Types of water shortages

- Physical water scarcity
 - Demand for water is higher than what the natural environment can supply because of low precipitation and high demand
- Economic water scarcity
 - Lack of investment in infrastructure so people cannot access sufficient water supplies / poverty so people cannot afford to buy water

Why some areas have water shortages

- Human
 - High population density means greater demand in a small area, so water deficit is more likely.
 - War / conflict causing displacement of people to refugee camps with poor water supplies
 - As the level of development increases demand for water in industry and leisure will increase, thus making it more likely to exceed supply.
 - As the level of technology in agriculture increases the demand for water will increase. Moreover if large numbers of the population are involved in crop farming the water used in irrigation will be very high causing demand to exceed supply
 - Insufficient investment in water infrastructure e.g. dams/ reservoirs and pipelines
 - Pollution of rivers and ground water due to urbanisation causing increased industrial waste and untreated sewage being dumped in rivers or infiltrating into ground water
- Physical (supply)
 - High temperatures = lots of evaporation, reduces supply of easily accessible water
 - Low rainfall / drought can cause long term water shortage, so supply is lower than usual demand
 - Natural disaster e.g. earthquake destroys water infrastructure e.g. dams and pipelines

Why do most MEDCs NOT experience water shortages

- Government can afford to build water infrastructure e.g. dams/ reservoirs and pipeline
- In MEDCs which have semi-arid climates the government can afford to build and run desalination plants
- Government can pay for the import of water during a drought

Impact of lack of clean water on local people

- Dehydration which can lead to death
- Illnesses and even death from polluted water spreading water borne diseases e.g. cholera and dysentery. 10% global disease is caused by unclean water
- Contaminated food supplies: polluted water is being used to irrigate crops and so these foods can become unhealthy
- Insufficient water for irrigation and watering animals so there is a food shortage leading to malnutrition
- Energy + time wasted collecting/carrying water from further away
- High cost of buying water from tankers/bottled water
- Poor hygiene due to lack of water for cleaning which can lead to illnesses

Methods to use water more sustainably

- Provide emergency water supplies

- e.g. using bottled water and water trucks
- Digging boreholes and wells to access groundwater in aquifers
- Building desalination plants
- Recycle water
 - Grey water can be treated and then used for some purposes that do not have to be the same standard of cleanliness as drinking water
 - It can be used to irrigate gardens/ golf courses or flush toilets
- Reduce water loss
 - Mend leaking pipes
 - Ensure less water is lost from evaporation by reducing the amount of water stored outside in hot climates
- Reduce water subsidies
 - In some countries e.g. US governments make the cost of water cheaper to make it more affordable for farmers and domestic use → this encourages farmers to use more water and not look for ways to farm more efficiently
- Crop choice
 - Grow more drought resistant crops e.g. millet which do not require so much water
- Education
 - Encourage population to use less water
- Farming techniques
 - Use more water efficient techniques which prevent water runoff e.g. contour ploughing and terracing

© Xingzhi Lu 2024

The environmental risks of development

2024年3月4日 8:52

Desertification

- The process by which an area of land to become a desert. It could be caused by physical or human factors

Causes of desertification

- Physical causes of desertification:
 - Low rainfall/ drought so:
 - Soils become dry
 - Water sources dry up
 - Vegetation dies and crops fail
- Human causes of desertification:
 - Population increases so:
 - More crops are grown causing over-cultivation and soil fertility decreases
 - More animals are kept causing over-grazing so plants do not regrow fast enough
 - Trees are cut down for fuelwood
 - Increased use of water so water sources dry up
- So there is less vegetation to protect the soil so the topsoil is blown away by the wind, causing dust storms and reduction in plant growth
- Desert is formed

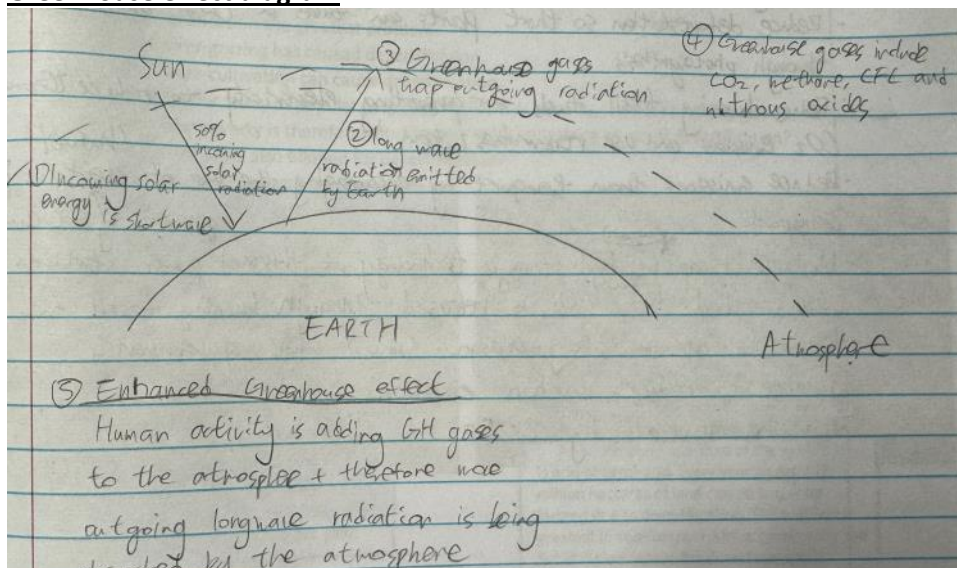
Impacts of desertification

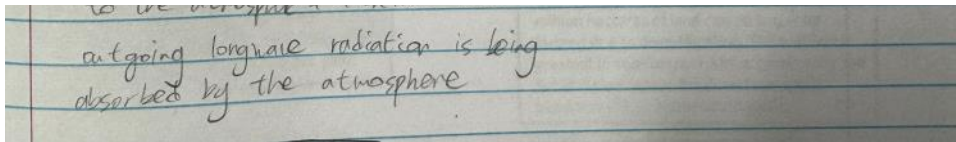
- Food and water shortage leading to malnutrition, famine and high death rates
- Large numbers of people become dependent on food aid programmes
- People migrate away from area to refugee camps or slums in the cities → over population of refugee camps and cities

Solutions to desertification

- Provide food aid and water supplies in refugees camps
- Encourage local population to conserve water in small scale schemes e.g. building low stone walls
- Improve farming methods to grow drought resistant crops e.g. millet
- Replanting trees to reduce erosion e.g. acacia trees
- Reduce population growth through anti natal schemes and investment in education and health care
- Improve long term water supplies through building dams/ reservoirs and drilling deeper wells
- International action to reduce climate change to reduce droughts

Greenhouse effect diagram





Cause of enhanced global warming

- Human activity has increased the amount of greenhouse gases e.g. CO₂, methane and nitrous oxides in the atmosphere
- These gases trap long wave radiation given off by the Earth and cause the temperatures to rise
- CO₂ mostly comes from burning fossil fuels for energy production and vehicles + cement production + the burning of forests from 'slash and burn' techniques
- Methane comes from cattle ranching (cows emit methane) and rice paddy fields and landfill sites
- Nitrous oxides come from vehicles and factories burning oil

Impacts of climate change

- The average surface temperature of the earth has increased by 0.8 C since the industrial revolution
 - Rise in temperatures varies globally with higher temperature rises in Antarctica and Arctics
- Ice sheets are melting
 - Causing sea levels to rise and coastal flooding of low-lying islands e.g. Tuvalu
- Permafrost is melting in the Arctic
 - Causing more methane to be released
- Changing rainfall patterns
 - Some areas becoming much drier and experiencing droughts e.g. Australia
 - This is increasing spread of wildfires
- Increasing acidity in the oceans
 - Causes bleaching of coral reefs
- Warming temperature and loss of ice in Arctic
 - Causing loss of habitat for animals e.g. polar bears

Solutions to enhanced global warming

- International agreements e.g. Paris 2015 with targets for richer countries to reduce the greenhouse gas emissions
- Increase recycling so that less energy is used to extract new materials
- Encourage people to use less energy in their homes by using energy saving machines and light bulbs
- Improve public transport to encourage people to use their cars less and encourage walking/cycling
- Increase the use of renewable energy sources + use electric cars instead of petrol/diesel (if electricity source is renewable)
- Increase afforestation so that trees could take in more CO₂ by photosynthesis and discourage deforestation
- Adapt to the new climate conditions e.g. use drought resistant crops like millet

Atmospheric pollution

- Sulphur dioxide and carbon dioxide produced by burning fossil fuels in vehicles and industry.
- SO₂ causes acid rain and CO₂ contributes to enhanced global warming
- Vehicles also produce nitrogen oxides which cause respiratory problems for humans and wildlife + acid rain
- These types of can be controlled by reducing traffic e.g. improving public transport and by encouraging the use of 'scrubbers' on factory chimneys to remove harmful gases

Water pollution

- Raw sewage dumped in rivers
 - Pollutes the water and causes water borne diseases e.g. cholera
 - This can be solved by treating sewage and building proper sanitation systems
- Industrial waste discharged into rivers and accidental leaks e.g. from oil pipes and oil tankers
 - These chemicals poison the water and are toxic for animals and fish
 - The solution is strict laws on industry to prevent waste dumps in rivers and having methods to deal with oil spills e.g. skimmers to collect the oil from the surface.

- Chemical fertilizers from farming can be washed into streams and rivers
 - Eutrophication: encourage algae to grow which block out sunlight and oxygen for marine ecosystems - kills water plants and animals
 - This can be solved by organic farming (not using chemicals)

Visual / light pollution

- Caused by industrial developments looking unattractive e.g. power stations, factories, waste heaps from mining
- Light pollution from urbanisation and tourism resorts can disturb wildlife and excessive artificial light at night time can impact on human health by causing loss of sleep and fatigue

Noise pollution

- In industry this is caused by the use of large machinery or explosions using dynamite in mining
- In urban areas this is caused by traffic, trains, aircraft or loud music
- Noise seriously disrupts wildlife and noise can cause ill health and high blood pressure in humans
- This can be solved by strict laws on permitted noise levels.

© Xingzhi Lu 2024

Sustainable development and resource conservation

2024年3月4日 8:52

Sustainable development

- Means meeting the needs of the present generation without compromising the needs of future generations to meet their needs

3 pillars of a sustainable tourism development

- Economic: provide job opportunities for the local population now and ensure that there will be jobs for the future people too
- Social: respect the local culture and traditions and make sure that the tourism activity does not cause problems for the local community
- Environment: preserve the natural landscape + animals, minimise pollution and limit use of fossil fuels

Resource conservation

- The protection and rational use of natural resources
- This may include encouraging a reduction in demand for a resource by encouraging people to change their lifestyle
 - e.g. to reduce the use of energy people are encouraged to use public transport, walk and cycle more or use energy saving lightbulbs and 'switch off' lights
- To conserve metals, glass and plastic: people and businesses are encouraged to reuse and recycle these materials

© Xingzhi Lu 2024

Dubai energy mix

2024年2月19日 23:39

Energy consumption

- 8,000 kg of oil equivalent per person which is more than double the amount used in the UK

Why is energy use so high?

- Dubai is a highly developed city with a wealthy population and high number of wealthy tourists
 - A high demand for domestic + industrial electricity
- High car ownership encourages high use of petrol/diesel
- Dubai is energy rich and has its own fossil fuel reserves + it can buy oil cheaply from neighbouring Abu Dhabi
 - This means that the energy costs are relatively cheap
- Hot desert climates with high temperatures in summer
 - Encourages use of air conditioning which uses a lot of electricity
- Low rainfall and lack of sufficient underground water supplies
 - Encouraged the use of desalination plants which use huge amounts of energy

Dubai's energy mix for electricity production

- An electricity generation system 98% powered by natural gas power plants in 2010
 - 50% domestically produced + 48% imported
 - Large amount of natural gas reserves → plentiful supply available
 - Natural gas is the cleanest fossil fuel with least greenhouse gases emissions + plentiful supply available
 - Oil is used as an emergency backup
- Transition to a future with 100% powered by nuclear, solar and other renewable energies
 - They do not want to rely on Abu Dhabi for their future energy supplies
 - They want to substantially reduce their carbon emissions.
- By 2030
 - 25% solar, 7% nuclear, 7% coal and 61% gas
 - Solar because Dubai has reliable sunshine all year round + mature technology + low cost
 - The nuclear power will mainly come from the Barakah Power Plant in Abu Dhabi, generate 5.6GW of electricity
 - Potential of another smaller plant built in Dubai
 - Solar is from the Mohammed bin Rashid Al Maktoum Solar park, generate 13MW of electricity
 - The clean coal power will come from the Hassyan plant in Dubai

Energy mix explanation

- Dubai has not diversified their energy mix because the UAE has large reserves of oil and natural gas
 - The UAE is the world's 7th largest energy producer and has enough oil and natural gas to last 100 years
 - Dubai uses the natural gas for electricity generation and the oil for transport.
- Problems with the energy mix
 - Use of oil and natural gas is increasing steadily at 4% per year.
 - Dubai is the 6th highest producer of CO₂ per capita in the world: high contributor to climate change
 - The reserves of natural gas are running out and Dubai has become a net importer of natural gas from its neighbour Abu Dhabi
 - Dubai energy is too reliant on fossil fuels + oil and natural gas reserves are running out
 - Electricity production is causing air pollution over the city because the gas thermal power stations are close to the city

Dubai water supply

2024年2月19日 23:39

Dubai's water use

- Highest per capita water consumption in the world at 550 litres per person per day
 - Dubai is a highly developed city with a wealthy population and high number of wealthy tourists → a high demand for domestic water supplies
 - Hot desert climates with high temperatures in summer encourages use of air conditioning which uses a lot of water
- 67% of water used in agriculture
 - Farmers are growing crops in hot, arid climate → dependent on irrigation
 - Dubai grows the fresh fruit and vegetables to be sold in the other Emirates
 - Irrigation is inefficient with 30% lost to evaporation when the water is sprayed on crops
- 9% of water used for industry
 - To cool and clean machines
 - There is only limited industry located in Dubai
- 24% of water used for tourism
 - Hotels have high demand due to air conditioning + swimming pools
 - Sites: Atlantis Aqua adventure, Dubai mall aquarium, irrigating golf courses

Methods to obtain water (explain how boreholes / wells + desalination plants work)

- 72% groundwater from the 2 freshwater aquifers
- 21% from 8 desalination plants e.g. Jebel Ali Power Plant and Desalination Complex: supplies all drinking water
- 7% retreated or recycled water
 - 20 waste treatment works
 - Sewage plants
 - Solid filtered first, then chlorine added to kill harmful bacteria
 - Water only used for agriculture + irrigating green spaces
- Wadis
 - Flat river valleys in desert areas, which have empty riverbeds in dry season then rivers when wet
 - Dams placed on wadis so water is collected in wet seasons
- Pipe network to pipe water to people's houses

Problems with the water

- Dubai is highest per capita water consumer in the world BUT fresh water is scarce
 - Rainfall is less than 250mm per year and there is no surface water e.g. river or reservoir
- Underground aquifer is running out
- Desalination requires a lot of energy and is damaging to the environment
- Population and number of tourists is growing rapidly so there is increasing demand for food and water
- Misuse of limited water supply for gardens + fountains etc.
- Water infrastructure is ageing and the pipelines are corroded/ leaking which wastes water
- Currently not enough water is recycled. However there are plans to use new techniques to irrigate agriculture using drip irrigation and to plant crops which require less water