

Relief of the UK

Relief of the UK can be divided into uplands and lowlands. Each have their own characteristics.

Key

- Lowlands
- Uplands

Areas +600m: Peaks and ridges cold, misty and snow common. i.e. Scotland

Areas -200m: Flat or rolling hills. Warmer weather. i.e. Fens

Formation of Coastal Spits - Deposition

Example: Spurn Head, Holderness Coast.

- Swash moves up the beach at the angle of the prevailing wind.
- Backwash moves down the beach at 90° to coastline, due to gravity.
- Zigzag movement (Longshore Drift) transports material along beach.
- Deposition causes beach to extend, until reaching a river estuary.
- Change in prevailing wind direction forms a hook.
- Sheltered area behind spit encourages deposition, salt marsh forms.

Types of Erosion

The break down and transport of rocks – smooth, round and sorted.

Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolves rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

Types of Transportation

A natural process by which eroded material is carried/transported.

Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.

Mass Movement

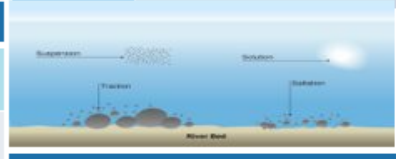
A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.

- Rain saturates the permeable rock above the impermeable rock making it heavy.
- Waves or a river will erode the base of the slope making it unstable.
- Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
- The debris at the base of the cliff is then removed and transported by waves or river.

Types of Weathering

Weathering is the breakdown of rocks where they are.

Carbonation	Breakdown of rock by changing its chemical composition.
Mechanical	Breakdown of rock without changing its chemical composition.



What is Deposition?

When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.



Unit 1c Physical Landscapes in the UK

AQA

Formation of Bays and Headlands

Bay (Soft rock)

Headland (Hard rock)

- Waves attack the coastline.
- Softer rock is eroded by the sea quicker forming a bay, calm area causes deposition.
- More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

How do waves form?

Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

Why do waves break?

- Waves start out at sea.
- As waves approaches the shore, friction slows the base.
- This causes the orbit to become elliptical.
- Until the top of the wave breaks over.

Mechanical Weathering Example: Freeze-thaw weathering

Stage One
Water seeps into cracks and fractures in the rock.

Stage Two
When the water freezes, it expands about 9%. This wedges apart the rock.

Stage Three
With repeated freeze-thaw cycles, the rock breaks off.

Types of Waves

Constructive Waves	Destructive Waves
This wave has a swash that is stronger than the backwash. This therefore builds up the coast.	This wave has a backwash that is stronger than the swash. This therefore erodes the coast.

- Fetch how far the wave has travelled
- Strength of the wind.
- How long the wind has been blowing for.

Formation of Coastal Stack

Example: Old Harry Rocks, Dorset

- Hydraulic action widens cracks in the cliff face over time.
- Abrasion forms a wave cut notch between HT and LT.
- Further abrasion widens the wave cut notch to form a cave.
- Caves from both sides of the headland break through to form an arch.
- Weather above/erosion below – arch collapses leaving stack.
- Further weathering and erosion leaves a stump.

Coastal Defences

Hard Engineering Defences

Groynes	Wood barriers prevent longshore drift, so the beach can build up.	<ul style="list-style-type: none"> ✓ Beach still accessible. ✗ No deposition further down coast = erodes faster.
Sea Walls	Concrete walls break up the energy of the wave. Has a lip to stop waves going over.	<ul style="list-style-type: none"> ✓ Long life span ✓ Protects from flooding ✗ Curved shape encourages erosion of beach deposits.
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	<ul style="list-style-type: none"> ✓ Cheap ✓ Local material can be used to look less strange. ✗ Will need replacing.

Soft Engineering Defences

Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	<ul style="list-style-type: none"> ✓ Cheap ✓ Beach for tourists. ✗ Storms = need replacing. ✗ Offshore dredging damages seabed.
Managed Retreat	Low value areas of the coast are left to flood & erode.	<ul style="list-style-type: none"> ✓ Reduce flood risk ✓ Creates wildlife habitats. ✗ Compensation for land.

Case Study: Hunstanton Coast

Location and Background
Located on the North-West coast of Norfolk. The town is a popular sea resort for tourists to visit all year round. In 2013, the town suffered damage from a storm surge. The Sea Life Centre was flooded and closed for a number of months.

Geomorphic Processes
- Old Hunstanton is dominated by dunes that are formed when sand is trapped and built up behind objects.
- Hunstanton Cliffs are made from three different bands of rock (sandstone, red chalk and white chalk).
- Hunstanton Cliff are exposed to cliff retreat. This is when a wave-cut notch develops enough for the cliff face to become unstable and eventually collapses.
- Longshore drift travels from Sheringham in the north to the Wash in the south.

Management
- Hunstanton is protected by a number of groynes. These trap sand to build up the beach for better protection.
- The town is also protected by large sea walls to prevent flooding and deflect the waves energy.
- \$15 million has been spent on beach nourishment to add sediment to beach for increased protection against flooding.

Water Cycle Key Terms

Precipitation	Moisture falling from clouds as rain, snow or hail.
Interception	Vegetation prevent water reaching the ground.
Surface Runoff	Water flowing over surface of the land into rivers
Infiltration	Water absorbed into the soil from the ground.

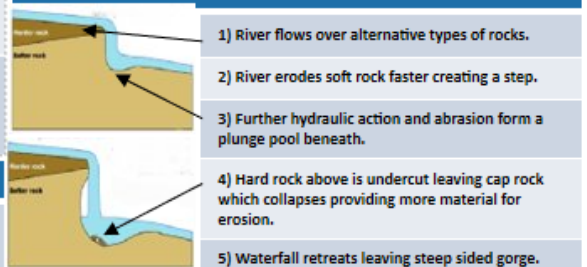
Physical and Human Causes of Flooding.

Physical: Prolong & heavy rainfall Long periods of rain causes soil to become saturated leading runoff.	Physical: Geology Impermeable rocks causes surface runoff to increase river discharge.
Physical: Relief Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.	Human: Land Use Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.

Upper Course of a River

Near the source, the river flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

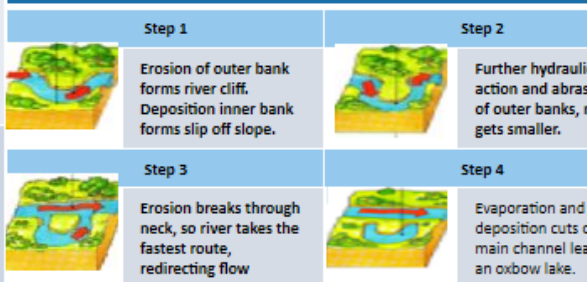
Formation of a Waterfall



Middle Course of a River

Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

Formation of Ox-bow Lakes



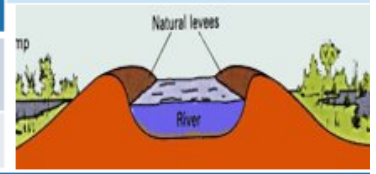
Lower Course of a River

Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.

Formation of Floodplains and levees

When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials build up to form natural levees.

✓ Nutrient rich soil makes it ideal for farming.
✓ Flat land for building houses.

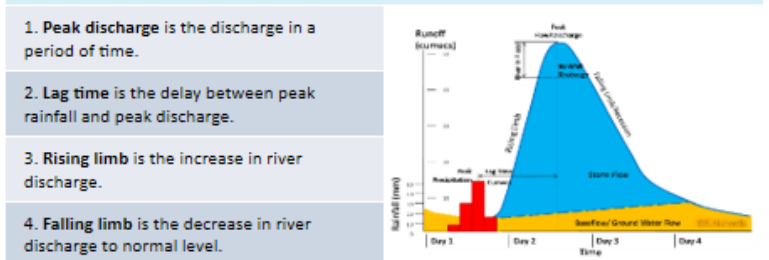


River Management Schemes

Soft Engineering	Hard Engineering
<ul style="list-style-type: none"> Afforestation – plant trees to soak up rainwater, reduces flood risk. Demountable Flood Barriers put in place when warning raised. Managed Flooding – naturally let areas flood, protect settlements. 	<ul style="list-style-type: none"> Straightening Channel – increases velocity to remove flood water. Artificial Levees – heightens river so flood water is contained. Deepening or widening river to increase capacity for a flood.

Hydrographs and River Discharge

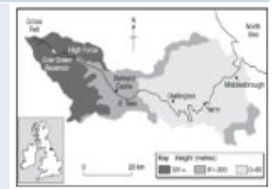
River discharge is the volume of water that flows in a river. Hydrographs who discharge at a certain point in a river changes over time in relation to rainfall



Case Study: The River Tees

Location and Background
Located in the North of England and flows 137km from the Pennines to the North Sea at Red Car.

Geomorphic Processes
Upper – Features include V-Shaped valley, rapids and waterfalls. **Highforce Waterfall** drops 21m and is made from harder Whinstone and softer limestone rocks. Gradually a gorge has been formed.
Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town.
Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.



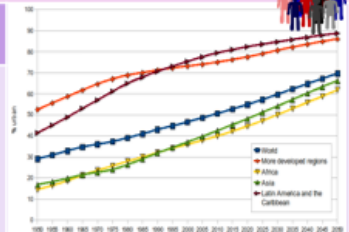
Management
- Towns such as Yarm and Middleborough are economically and socially important due to houses and jobs that are located there.
- Dams and reservoirs in the upper course, controls river's flow during high & low rainfall.
- Better flood warning systems, more flood zoning and river dredging reduces flooding.

What is Urbanisation?

This is an increase in the amount of people living in urban areas such as towns or cities. In 2007, the UN announced that for the first time, more than 50 % of the world's population live in urban areas.

Where is Urbanisation happening?

Urbanisation is happening all over the world but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.



Causes of Urbanisation

Rural - urban migration (1)
The movement of people from rural to urban areas.

Push	Pull
<ul style="list-style-type: none"> Natural disasters War and Conflict Mechanisation Drought Lack of employment 	<ul style="list-style-type: none"> More Jobs Better education & healthcare Increased quality of life. Following family members.

Natural Increase (2)
When the birth rate exceeds the death rate.

Increase in birth rate (BR)	Lower death rate (DR)
<ul style="list-style-type: none"> High percentage of population are child-bearing age which leads to high fertility rate. Lack of contraception or education about family planning. 	<ul style="list-style-type: none"> Higher life expectancy due to better living conditions and diet. Improved medical facilities helps lower infant mortality rate.

Types of Cities

Megacity
An urban area with over 10 million people living there.



More than two thirds of current megacities are located in either NEEs (Brazil) and LICs (Nigeria). The amount of megacities are predicted to increase from 28 to 41 by 2030.

Sustainable Urban Living

Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations also can use them.

Water Conservation

This is about reducing the amount of water used.

- Collecting rainwater for gardens and flushing toilets.
- Installing water meters and toilets that flush less water.
- Educating people on using less water.

Energy Conservation

Using less fossil fuels can reduce the rate of climate change.

- Promoting renewable energy sources.
- Making homes more energy efficient.
- Encouraging people to use energy.

Creating Green Space

Creating green spaces in urban areas can improve places for people who want to live there.

- Provide natural cooler areas for people to relax in.
- Encourages people to exercise.
- Reduces the risk of flooding from surface runoff.

Waste Recycling

More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill.

- Collection of household waste.
- More local recycling facilities.
- Greater awareness of the benefits in recycling.

Unit 2a AQA Urban Issues & Challenges

Sustainable Urban Living Example: Freiburg

Background & Location	Sustainable Strategies
<p>Freiburg is in west Germany. The city has a population of about 220,000. In 1970 it set the goal of focusing on social, economic and environmental sustainability.</p>	<ul style="list-style-type: none"> The city's waste water allows for rainwater to be retained. The use of sustainable energy such as solar and wind is becoming more important. 40% of the city is forested with many open spaces for recreation, clean air and reducing flood risk.

Integrated Transport System

This is the linking of different forms of public and private transport within a city and the surrounding area.

Brownfield Site

Brownfield sites is an area of land or premises that has been previously used, but has subsequently become vacant, derelict or contaminated.

Traffic Management

Urban areas are busy places with many people travelling by different modes of transport. This has caused urban areas to experience different traffic congestion that can lead to various problems.

Environmental problems

- Traffic increases air pollution which releases greenhouse gases that is leading to climate change.



Economic problems

- Congestion can make people late for work and business deliveries take longer. This can cause companies to loose money.

Social Problems

- There is a greater risk of accidents and congestion is a cause of frustration. Traffic can also lead to health issues for pedestrians.

Congestion Solutions

- Widen roads to allow more traffic to flow easily.
- Build ring roads and bypasses to keep through traffic out of city centres.
- Introduce park and ride schemes to reduce car use.
- Encourage car-sharing schemes in work places.
- Have public transport, cycle lanes & cycle hire schemes.
- Having congestion charges discourages drivers from entering the busy city centres.



Traffic Management Example: Bristol

In 2012 Bristol was the most congested city in the UK. Now the city aims to develop it's integrated transport system to encourage more people to use the public transport. The city has also invested in cycle routes and hiring schemes.



Greenbelt Area


This is a zone of land surrounding a city where new building is strictly controlled to try to prevent cities growing too much and too fast.

Urban Regeneration

The investment in the revival of old, urban areas by either improving what is there or clearing it away and rebuilding.

Urban Change in a Major UK City: Sheffield Case Study



Location and Background	City's Importance
<p>Sheffield is a city in South Yorkshire in the North of England. The population of the city is 575,000, making it the fifth largest in the UK. The city grew during the industrial revolution.</p> 	<ul style="list-style-type: none"> The city enjoys a large sporting heritage with famous athletes and football clubs. Sheffield is famous for being described as the greenest city in Europe. Sheffield has a thriving community of international students. Sheffield has two major UK universities popular with young students. Fastest growing city outside of London.
Migration to Sheffield	City's Opportunities
<p>During the industrial revolution, the population dramatically increased with people migrating from nearby rural communities.</p> <p>With the attraction of working in the large steelworks or mines, international migrants from Ireland, Pakistan and the Caribbean came to work in Sheffield from 1900-1960.</p> <p>More recently, refugees have arrived from Syria and Iraq. Also Sheffield has attracted thousands of students from the UK & abroad.</p>	<p>Social: Sheffield has various cultural attractions such as the Crucible Theatre & museums. Also Meadowhall is very popular with shoppers.</p> <p>Economic: The retail sectors contribute to thousands of jobs. The Universities and advanced manufacturing adds contribute to the city's economy.</p> <p>Environmental: Sheffield is described as being the greenest city in Europe. It's close to the Peak District and has various open spaces (i.e. the Peace Garden) for residents to enjoy.</p>
City Challenges	Sheffield City Centre Regeneration Projects
<p>Social: House prices have increased along with greater house shortages. A third of households live in the 10% of the most deprived wards in the UK.</p> <p>Economic: Closure of the steelworks and factories caused large scale unemployment. Poor transport connections to large economic hubs such as London and Manchester.</p> <p>Environmental: Urban sprawl has led to increased pressure and decline of greenfield sites around the city.</p>	<p>Aims: Sheffield wanted to attract investment in more businesses and job opportunities. Also the projects aim to improve public spaces with more green urban environments.</p> <p>Main features: Brownfield sites and derelict buildings pulled down, £50 million invested on its train station to improve connections, £120 million on green open spaces with the construction of the Winter Gardens and Peace Gardens, £430m to improve the retail quarter and attract shoppers away from Meadowhall.</p>



Urban Change in a Major NEE City: RIO DE JANEIRO Case Study



Location and Background	City's Importance
<p>Rio is a coastal city situated in the South East region of Brazil within the continent of South America. It is the second most populated city in the country (6.5 million) after Sao Paulo.</p> 	<ul style="list-style-type: none"> Has the second largest GDP in Brazil It is headquarters to many of Brazil's main companies, particularly with Oil and Gas. Sugar Loaf mountain is one of the seven wonders of the world. One of the most visited places in the Southern Hemisphere. Hosted the 2014 World Cup and 2016 Summer Olympics.
Migration to Rio De Janeiro	City's Opportunities
<p>The city began when Portuguese settlers with slaves arrived in 1502. Since then, Rio has become home to various ethnic groups.</p> <p>However, more recently, millions of people have migrated from rural areas that have suffered from drought, lack of services and unemployment to Rio. People do this to search for a better quality of life.</p> <p>This expanding population has resulted in the rapid urbanisation of Rio de Janeiro.</p>	<p>Social: Standards of living are gradually improving. The Rio Carnival is an important cultural event for traditional dancing and music.</p> <p>Economic: Rio has one of the highest incomes per person in the country. The city has various types of employment including oil, retail and manufacturing.</p> <p>Environmental: The hosting of the major sporting events encouraged more investment in sewage works and public transport systems.</p>
City Challenges	Self-help schemes - Rocinha, Bairro Project
<p>Social: There is a severe shortage of housing, schools and healthcare centres available. Large scale social inequality, is creating tensions between the rich and poor.</p> <p>Economic: The rise of informal jobs with low pay and no tax contributions. There is high employment in shanty towns called Favelas</p> <p>Environmental: Shanty towns called Favelas are established around the city, typically on unfavourable land, such as hills.</p>	<ul style="list-style-type: none"> The authorities have provided basic materials to improve peoples homes with safe electricity and sewage pipes. Government has demolished houses and created new estates. Community policing has been established, along with a tougher stance on gangs with military backed police. Greater investment in new road and rail network to reduce pollution and increase connections between rich and poor areas.






Resource Challenges

Resources are things that humans require for life or to make our lives easier. Humans are becoming increasingly dependent on exploiting these resources, and as a result they are in high demand.

Significance of Water

Resources such as food, energy and water are what is needed for basic human development.

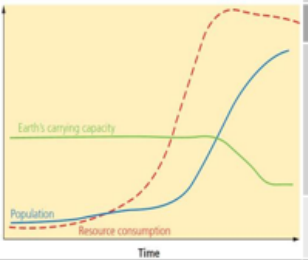
FOOD 	WATER 	ENERGY 
Without enough nutritious food, people can become malnourished . This can make them ill. This can prevent people working or receiving education.	People need a supply of clean and safe water for drinking, cooking and washing. Water is also needed for food, clothes and other products.	A good supply of energy is needed for a basic standard of living. People need light and heat for cooking or to stay warm. It is also needed for industry.

Demand outstripping supply

The demand for resources like food, water and energy is rising so quickly that supply cannot always keep up. Importantly, access to these resources vary dramatically in different locations

1. Population Growth

- Currently the global population is **7.3 billion**.
- Global population has risen **exponentially** this century.
- Global population is expected to reach **9 billion by 2050**.
- With more people, the **demand** for food, water, energy, jobs and space will **increase**.



3. Changing Technology and Employment

- The demand for resources has driven the **need for new technology** to reach or gain more resources.
- More people in the **secondary and tertiary industry** has increased the **demand for resources** required for electronics and robotics.

2. Economic Development


- As LICs and NEEs develop further, they require **more energy** for industry.
- LICs and NEEs want similar lifestyles to HICs, therefore they will need to **consume more resources**.
- Development means **more water** is required for food production as diets improve.



Resource Reliance Graph

Consumption – The act of using up resources or purchasing goods and produce.
Carry Capacity – A maximum number of species that can be supported.

Resource consumption exceeds Earth's ability to provide!

Food in the UK


Growing Demand	Impact of Demand 
<ul style="list-style-type: none"> The UK imports about 40% of its food. This increases people's carbon footprint. There is growing demand for greater choice of exotic foods needed all year round. Foods from abroad are more affordable. Many food types are unsuitable to be grown in the UK. 	<p>Foods can travel long distances (food miles). Importing food adds to our carbon footprint.</p> <ul style="list-style-type: none"> + Supports workers with an income + Supports families in LICs. + Taxes from farmers' incomes contribute to local services. - Less land for locals to grow their own food. - Farmers exposed to chemicals.

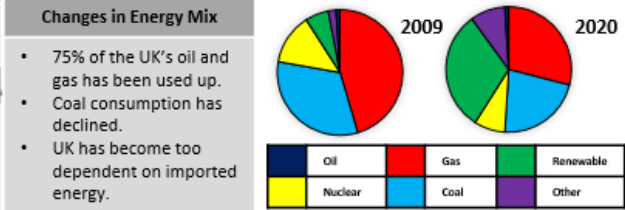
Agribusiness 	Sustainable Foods 
<p>Farming is being treated like a large industrial business. This is increasing food production.</p> <ul style="list-style-type: none"> + Intensive farming maximises the amount of food produced. + Using machinery which increases the farms efficiency. - Only employs a small number of workers. - Chemicals used on farms damages the habitats and wildlife. 	<p>Organic foods that have little impact on the environment and are healthier have been rising. Local food sourcing is also rising in popularity.</p> <ul style="list-style-type: none"> Reduces emissions by only eating food from the UK. Buying locally sourced food supports local shops and farms. A third of people grow their own food.

Unit 2c

The Challenge of Resource Management



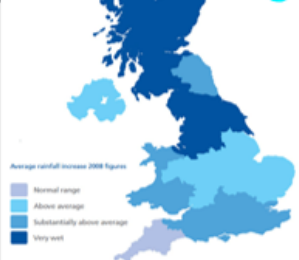
Energy in the UK

Growing Demand	Energy Mix 
The UK consumes less energy than compared to the 1970s despite a smaller population. This is due to the decline of industry .	The majority of UK's energy mix comes from fossil fuels . By 2020, the UK aims for 15% of its energy to come from renewable sources . These renewable sources do not contribute to climate change .



Water in the UK

Growing Demand	Deficit and Surplus
<p>The average water used per household has risen by 70%. This growing demand is predicted to increase by 5% by 2020.</p> <p>This is due to:</p> <ul style="list-style-type: none"> A growing UK population. Water-intensive appliances. Showers and baths taken. Industrial and leisure use. Watering greenhouses. 	<p>The north and west have a water surplus (more water than is required).</p> <p>The south and east have a water deficit (more water needed than is actually available).</p> <p>More than half of England is experiencing water stress (where demand exceeds supply).</p>

Pollution and Quality 	Water stress in the UK 
<p>Cause and effects include:</p> <ul style="list-style-type: none"> Chemical run-off from farmland can destroy habitats and kills animals. Oil from boats and ships poisons wildlife. Untreated waste from industries creates unsafe drinking water. Sewage containing bacteria spreads infectious diseases. 	

Management

UK has strict laws that limits the amount of discharge from factories and farms. **Education campaigns** to inform what can be disposed of safely. **Waste water treatment plants** remove dangerous elements to then be used for safe drinking. **Pollution traps** catch and filter pollutants.

Water Transfer

Water transfer involves moving water through pipes from areas of surplus (Wales) to areas of deficit (London).

Opposition includes:

- Effects on **land and wildlife**.
- High maintenance costs**.
- The **amount of energy** required to move water over long distances.



Energy in the UK (continued)

Significance of Renewables	Exploitation				
<ul style="list-style-type: none"> + The UK government is investing more into low carbon alternatives. + UK government aims to meet targets for reducing emissions. + Renewable sources include wind, solar and tidal energy. - Although infinite, renewables are still expensive to install. - Shale gas deposits may be exploited in the near future 	<table border="1"> <thead> <tr> <th>Nuclear</th> <th>Wind Farm</th> </tr> </thead> <tbody> <tr> <td> <p>New plants provide job opportunities.</p> <p>Problems with safety and possible harm to wildlife.</p> <p>Nuclear plants are expensive.</p> </td> <td> <p>Locals have low energy bills.</p> <p>Reduces carbon footprint.</p> <p>Construction cost is high.</p> <p>Visual impacts on landscape.</p> <p>Noise from wind turbines.</p> </td> </tr> </tbody> </table>	Nuclear	Wind Farm	<p>New plants provide job opportunities.</p> <p>Problems with safety and possible harm to wildlife.</p> <p>Nuclear plants are expensive.</p>	<p>Locals have low energy bills.</p> <p>Reduces carbon footprint.</p> <p>Construction cost is high.</p> <p>Visual impacts on landscape.</p> <p>Noise from wind turbines.</p>
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Option 1: FOOD



Food Security is when people at all times need to have physical & economic access to food to meet their dietary needs for an active & healthy life. This is the opposite to Food Insecurity which is when someone is unsure when they might next eat.

Human 	Physical 
<ul style="list-style-type: none"> Poverty prevents people affording food and buying equipment. Conflict disrupts farming and prevents supplies. Food waste due to poor transport and storage. Climate Change is affecting rainfall patterns making food production difficult. 	<ul style="list-style-type: none"> The quality of soil is important to ensure crops have key nutrients. Water supply needs to be reliable to allow food to grow. Pest, diseases and parasites can destroy vast amounts of crops that are necessary to populations. Extreme weather events can damage crops (i.e. floods).

Daily Calorie Intake



This map shows how many calories per person that are consumed on average for each country. This can indicate the global distribution of available food and food inequality.

Food Supply



This map shows the amount of food produced in different countries. Whilst Asia and North America have high production outputs, Africa and Central America have low production outputs.

Increasing Food Supply 

C.S. Thanet Earth 

Hydroponics - A method of growing plants without soil. Instead they use nutrient solution.

New Green Revolution - Aims to improve yields in a more sustainable way. Involves using both GM varieties and traditional and organic farming.

Biotechnology - Genetically modified (GM) crops changes the DNA of foods to enhance productivity and properties.

Irrigation - Artificially watering the land so crops can grow. Useful in dry areas to make crops more productive.

Located in Kent, the site involves four huge greenhouses using hydroponics.

Advantages

- Supports more than 500 jobs.
- Produces food all year round.
- Provides UK with food security.

Disadvantages

- Money generated mostly goes to large companies not community.
- Requires a lot of energy.
- Causes visual & light pollution.

Sustainable Food Supply 

C.S. NEE- Indus Basin Irrigation System 

This ensures that fertile soil, water and environmental resources are available for future generations.

Largest irrigation scheme in the world. Involves large and small dams. Thousands of channels provides water to supports Pakistan's rich farmlands.

Organic Farming - The banned use of chemicals and ensuring animals are raised naturally.

Permaculture - People growing their own food and changing eating habits. Fewer resources are required.

Urban Farming - Planting crops in urban areas. i.e. roundabouts.

Managed Fishing - Includes setting catch limits, banning trawling and promoting pole and line methods.

Advantages

- Improves food security by adding 40% more land for farming.
- Increased yield & range of foods.



Disadvantages

- Few take an unfair share of water
- Water is wasted and demand is rising due to population growth.
- High cost to maintain reservoirs.

Option 2: WATER



Water security is when people have good access to enough clean water to sustain well-being and good health. Water insecurity is when areas are without sufficient water supplies. Water Stress is when less than 1700m³ is available per person.

Human 	Physical 
<ul style="list-style-type: none"> Pollution caused from human and industrial waste being dumped into peoples water sources. Poverty prevents low income families affording water. Limited infrastructure such as a lack of water pipes and sewers. Over-abstracting is when more water is taken than is replaced. 	<ul style="list-style-type: none"> Climate needs to provide enough rainfall to feed lakes and rivers. Droughts affect supply if water. Geology can affect accessibility to water. Permeable rock means sourcing water from difficult aquifers, whereas impermeable allows water to run-off into easily collected basins.

Impact of Water Insecurity 

Food production

The less water available for irrigating crops the less food that will be produced. This could lead to starvation.

Industrial output

Manufacturing industries depend heavily on water. A severe lack of water can impact economic output.

Disease and Water Pollution

Inadequate sanitation systems pollutes drinking water causing diseases such as cholera and typhoid.

Water conflict

Water sources that cross national borders can create tensions and even war between countries.

Increasing Water Supply 

C.S. Lesotho Highland Water Project 

Water diversion - Involves diverting water to be stored for longer periods. Often water is pumped underground to prevent evaporation.

Dams and Reservoirs - Dams control flow and storage of water. Water is released during times of water deficit.

Water transfer - includes schemes to move water from areas of surplus to areas of deficit.

Desalination - Involves the extraction of salt from sea water to produce fresh drinking water.

Lesotho is a highland country dependent on South Africa. Lesotho has water surplus due to high rainfall.

Advantages

- Provides 75% of Lesotho's GDP.
- Provides water to areas of drought in South Africa.

Disadvantages

- Dams displaced 30,000 people.
- Destruction to key ecosystems.
- 40% lost through pipe leakages.

Sustainable Water Supply 

C.S. NEE - The Wakel River Basin 

Ensures water supplies don't cause damage to the environment whilst also supporting the local economy.

A project in India that aims to improve water use by encouraging greater use of rainwater harvesting techniques.

Water conservation - Aims to reduce the amount of water wasted.

Groundwater Management - Involves the monitoring of extracting groundwater. Laws can be introduced.

Recycling and 'Grey' Water - Means taking water that has already been used and using it again rather than returning it to a river or the sea. This includes water taken from bathrooms and washing machines.



How does the project work?

- Provides 'taankas' that store water underground.
- Small dams called 'johed' interrupt water flow and encourages infiltration.
- Villages take turns to irrigate their fields so water is not overused.
- Maintained by farmers so it is entirely sustainable.
- Greater education for awareness.


Option 3: ENERGY



Energy security means having a reliable, uninterrupted and affordable supply of energy available. Energy insecurity can be experienced by countries with both a high and low energy consumption. Technology is increasing energy consumption.

Physical 	Economic 
<ul style="list-style-type: none"> Geology determines the availability of fossil fuels. Climate variations will affect the potential use of renewable energy. Natural disasters can damage energy infrastructure. 	<ul style="list-style-type: none"> Cost of extracting fossil fuels is becoming costly and difficult. Price of fossil fuels are volatile to potential political changes. Infrastructure for energy is costly, especially for LICs.

Technology 	Political 
<ul style="list-style-type: none"> New technology is making once difficult energy sources now reachable/exploitable. 	<ul style="list-style-type: none"> Conflict and turmoil in energy rich countries can affect exports. Stricter regulations over Nuclear.

Impact of Energy Insecurity 

Sensitive environments

Exploration of energy resources threatens to harm sensitive areas such as the oil drilling in Alaska, USA.

Food production

Food production depends on the energy needed to power machinery and transport goods to different markets.

Energy conflict

Shortages of energy resources can lead to tensions and violence. Conflict can be caused by fear of energy insecurity.

Industry

Countries can suffer from shortfalls in energy leading to a decline in manufacturing and services.

Increasing Energy Supply

C.S. UK Fracking 

Non-renewables

Fossil Fuels - Conventional power stations can be made more efficient with carbon capture overcoming the environmental impacts.

Nuclear - Once a nuclear plant is built it can provide a cheap and long-term dependable source of energy.

Renewables

Wind, Solar, Biomass - These are examples of environmentally friendly renewable sources that can't run out but cost a lot to install.

Fracking is used to extract natural gas trapped in underground shale rock. It is a method considered by the UK.

Advantages

- Estimated to create 64,000 jobs.
- UK has large shale gas reserves.
- Is far cheaper than natural gas.

Disadvantages

- May cause groundwater pollution
- Is a non-renewable resource.
- May trigger minor earthquakes.

Sustainable Energy Supply

C.S. NEE - Chambamontera 

This involves balancing supply & demand. It also includes reducing waste & supporting the environment.

Chambamontera is an isolated community in the Andes of Peru. It introduced a micro-hydro to exploit water power as an energy source.

Home design - Building homes to conserve energy. i.e. roof insulation.

Reduce demand - Changing attitudes towards energy used to save energy.

Efficient technology - Making cars more efficient by improving engine design and weight. i.e. Hybrid engines.

Transport - Using public buses & bikes.

Benefits to the community

- Provides renewable energy.
- Low maintenance & running costs
- Has little environmental impacts.
- Using local labour and materials.
- Businesses are developing.
- Less wood is needed to be burnt.