

PAPER 2: HUMAN GEOGRAPHY

Section A: Urban Issues and Challenges (Parts 1-5)

- *Case study of a major city in a LIC or NEE: **Rio de Janeiro***
- *An example of how urban planning improves the quality of life for the urban poor: **Favela Bairro Project***
- *Case study of a major city in the UK: **Bristol***
- *An example of an urban regeneration project: **Temple Quarter***

Section B: The Changing Economic World (Parts 1-6)

- *An example of how tourism can reduce the development gap: **Jamaica***
- *A case study of an LIC or NEE: **Nigeria***
- *A case study of an HIC: the **UK***
- *An example of how modern industries can be environmentally sustainable: **Torr Quarry***

Section C: The Challenge of Resource Management (27-29)

- *Example of a large scale water management scheme: **Lesotho***
- *Example of a local scheme in an LIC to increase water sustainability: **The Wakel river basin project***

Section C: The Challenge of Resource Management (Parts 1 -4)

- *Example of a large scale water management scheme: **Lesotho***
- *Example of a local scheme in an LIC to increase water sustainability: **The Wakel river basin project***



WORLD'S ESSENTIAL RESOURCES

<p>Food Food is important because it affects your health. The World Health Organisation says we need 2000-2400 calories per day to be healthy. If you do not have sufficient food you become malnourished or suffer from undernutrition.</p> <ul style="list-style-type: none"> • Food surplus: North America, Europe, Australia, Russia, UK, USA • Food deficit: Africa (e.g. Chad, Congo, Ethiopia) 	<p>Water Water is important as we need it for our health and for economic development (agriculture, manufacturing, cleaning, drinking).</p> <ul style="list-style-type: none"> • Water surplus: areas where there is high rainfall and water storage (aquifers/reservoirs). E.g. USA, Canada, Europe, Russia • Water deficit: areas where there is low rainfall and a lack of water storage. E.g. Africa, Brazil, Argentina, Australia, China. 	<p>Energy Energy is important because it is used to build homes, heat homes, power machinery, make food...etc. It is also traded between countries and so helps a country develop.</p> <p>HICs consume (use) far more energy than LICs and NEEs.</p> <ul style="list-style-type: none"> • LICs – use very little energy (few machines, lack of processed foods, few families use power in their homes). • NEEs – use more energy (increase in factories = increased use of machines = more energy used). • HICs – use the most energy (lots of energy used in industries and homes, people eat a lot of processed foods).
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FOOD in the UK	WATER in the UK	ENERGY in the UK
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40% OF FOOD IN THE UK IS IMPORTED.		Water surplus	Areas with high rainfall and low population (<i>Wales & Scotland</i>)	<i>The UK's energy mix is...</i>	<ul style="list-style-type: none"> • 52.6% fossil fuels, 21% nuclear energy, • 24.7 renewable energies
Why?	<ul style="list-style-type: none"> ➢ Food is cheaper to make food in LICs. ➢ Demand for exotic foods (mangoes, bananas) ➢ Demand for seasonal foods all year round. ➢ Some foods cannot be grown in the UK. 	Water deficit	Low rainfall and high population (<i>south east England and parts of central England</i>).	<i>Fossil fuels will be used less because...</i>	<ol style="list-style-type: none"> 75% of oil and gas reserves are gone 100% of coalfields are closed down The EU fines companies who release too many greenhouse gases
Problem:	Increase in food miles (distance travelled by food to our plate) = increase in carbon footprint (the amount of CO2 a country produces).	Water transfer scheme	Water is moved from areas of surplus to areas of deficit. The government proposed a UK wide water grid in 2006, however it was not built due to high costs and impact on ecosystems. Some water transfer schemes do exist.	<i>Renewable energies will be used more because...</i>	The government has been investing in these sources.

SOLUTION		<p>The demand for water in the UK has increased in recent years. In fact households use 70% more water. This is because:</p> <ul style="list-style-type: none"> • More wealth = more household appliances that use water • Population increase & people wash more often 		<i>Fossil fuels will continue to be used because...</i>	<ol style="list-style-type: none"> Coal is cheap to import New nuclear stations and renewable energy infrastructure is expensive
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Organic Farming	HOWEVER ONLY 27% OF WATER IN THE UK IS CLASSIFIED AS CLEAN.	Economic and Environmental impact of each energy type
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<p>Small scale farming that produce local, seasonal food without the use of chemicals.</p> <ul style="list-style-type: none"> • Uses natural predators instead of pesticides • Crop rotation is used instead of fertilisers • Grows seasonal food locally. <p>It is usually more expensive because yields are low (less food is produced) and more people are employed, due to lack of machinery used. This means they need to charge a lot to make a profit.</p>	Causes	<ul style="list-style-type: none"> • Fertilizers in farming go into rivers • Chemical waste from factories pollutes rivers • Sewage is pumped into the sea • Oil from cars and boats goes into rivers/sea 	Fossil Fuels	<ul style="list-style-type: none"> • Ec. Coal must now be imported from South Africa. • Ec. Fossil fuels release greenhouse gases = global warming. The impacts of global warming are expensive to fix • En. Greenhouse gases = global warming. • En. Coal mines need land to be cleared = loss of habitats • En. Waste from mines = visual and noise pollution
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<p>Large scale intensive farms that use lots of machinery and chemicals to increase food production.</p> <ul style="list-style-type: none"> • Hedges are cut down = large fields • Machinery (combine harvester, tractors) • Fertilizers used to add nutrients to the soil • Technology – GM crops, hydroponics, high yielding varieties 	Impacts	<ul style="list-style-type: none"> • Waste from factories = toxic water = harm wildlife & humans • Fertilizers get into water = growth of algae = lack of oxygen and light in the pond = wildlife die (eutrophication) • Bacteria from sewage plants = diseases in river 	Renewable Energies	<ul style="list-style-type: none"> • Ec. New infrastructure is expensive to build • Ec. They are unreliable • En. Wind turbines and solar panels = visual and noise pollution and affect ecosystems.
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<p>More food can be produced = less needs to be imported. Use of machinery = fewer people employed = cheap food.</p>	Management	<ul style="list-style-type: none"> • UK has strict laws to control waste production and disposal • Chlorine added to water to remove bacteria. • Water treatment plants remove bacteria, algae and chemicals • Sewage systems are improved (e.g. the Tideway project in London) 	Nuclear Power	<ul style="list-style-type: none"> • Ec. Nuclear power stations are expensive to build (£18 billion) • Ec. Radioactive waste must be carefully stored = expensive. • En. Warm water waste can harm local ecosystems • En. Radioactive leaks harm people and wildlife (e.g. cancer)
<p>It can harm the ecosystem due to use of chemicals = water pollution.</p>				

Water Surplus and deficit	Areas of water surplus have plentiful supplies of water that exceeds their demand e.g. North America, Europe and parts of Asia. Many areas such as large parts of Africa have a water deficit where demand exceeds supply. This causes problems for people, industry and agriculture
Water Consumption	Water consumption is the amount of water people use. This is increasing globally as world population grows, people need to grow more food, to use for industrial development and for more energy. All energy production requires water.
Water insecurity	This is when a place does not have enough water for good well-being, health and economic development
Water stress	Water stress is when places come close to using up all their available water

CAUSES OF Water surplus or deficit

Climate	<ul style="list-style-type: none"> Regions with high rainfall usually have a water surplus whereas desert areas usually have a water deficit
Geology	<ul style="list-style-type: none"> Areas with permeable rocks at the surface and impermeable rocks underground can store rainwater water in underground aquifers so it doesn't evaporate away. 15% of Bristol's water comes from underground stores
Limited infrastructure	<ul style="list-style-type: none"> Poorer countries have limited water storage and transfer infrastructure as it is expensive to build so even though some countries have enough rainfall they cannot get it to the people who need it
Poverty	<ul style="list-style-type: none"> Many villages in poorer countries have no mains water connection so they much collect water from rivers and wells
Over abstraction	Where water is stored in the ground, if you use more than is being replaced by rainfall the underground water table falls (the level at which the soil underground is saturated with water) This causes wells and rivers to dry up

IMPACTS OF Water insecurity

Waterborn disease	Poorer countries often pollute their water supplies with sewage as there is little sanitation. Water shortage means people have to drink polluted water supplies causing disease like Cholera and dysentery. 1 billion litres of raw sewage enters the River Ganges in India each day
Food shortages	Farming uses 70% of global water supply for irrigating crops. Water shortages can lead to a drop in food production. In poor countries most people are poor subsistence farmers, growing food to survive, this leads to malnutrition and starvation
Industrial output	Industry uses huge amounts of water . By 2033 30% of all China's water will be used for industry. In times of water shortage factories shut down. This has cost China \$40 billion in lost output
Water conflict	Large rivers e.g. the Nile and Ganges run through several countries. If one country takes out too much water it can affect water supply in another country. There is conflict between Egypt and other African countries over use of the river Nile.

STRATEGIES TO INCREASE Water SUPPLY

Dams and reservoirs Advantages	<ul style="list-style-type: none"> ✓ Dams control the flow of rivers and water can be stored in huge man made reservoirs . This water can be released downstream when needed and extracted for use by towns and cities. ✓ Dams help to control rivers and prevent flooding
Disadvantages	<ul style="list-style-type: none"> X Dams are extremely expensive to construct and maintain X Reservoirs flood large areas of land where people live, forcing them to move X Dams flood large areas of land destroying habitats and bio-diversity X In hot countries, much of the water stored in reservoirs is lost through evaporation
Water transfer Advantages	<ul style="list-style-type: none"> ✓ Water transfers redistribute water from areas of surplus to areas of deficit using canals, pipes and river systems. This increased their water supply. <p>The Kielder water transfer scheme transfers water from the wetter North to the drier South East of the UK.</p> <p>Several schemes transfer water from central Wales to large cities like Birmingham and Liverpool</p>
Disadvantages	<ul style="list-style-type: none"> X The same disadvantages occur as for dams and reservoirs as these usually need to be built to store water
Desalination Advantages	<ul style="list-style-type: none"> ✓ This involves removing salt water from seawater by boiling and distilling it to produce fresh water. This increases fresh water supplies <p>Saudi Arabia has the most desalination plants in the world, followed by the USA and UAE.</p>
Disadvantages	<ul style="list-style-type: none"> X The process is extremely expensive so only happens in richer countries X Removed salt is dumped back into the sea, increasing salt levels which kill marine bio-diversity X Huge amounts of energy are used which produced greenhouse gases contributing to climate change X The huge cost of transferring water to inland areas that need it

Example Wakel River Basin Project

The exam paper will refer to this case study in an exam question as;
*'Using an example of a **small scale Water Management Scheme** that you have studied...*

Example exam question: To what extent has a local scheme for increasing sustainable water supplies been successful?

Key idea: The **Wakel River Basin** is located in the south of **Rajasthan (North-West India)**. It is the **driest** and **poorest** part of India & largely covered by the **Thar Desert**. **Water Management in the region has been poor**, but an **NGO** (non-government organisation) has been **working with locals to increase water supply & storage using appropriate local solutions**. They've also **raised awareness in local communities of effective water management**. Therefore this is a **sustainable** project.

Water Supply Issues:

Climate. Summer temperatures can reach **53°C**. Rainfall is less than 250mm per year with 96% of this between June and September. There's **little surface water as rain quickly soaks away or evaporates**.

Poor Water Management. **Over-use of water for irrigation** and taking too much water from **pumps has reduced the water table & some wells have dried up**. This had led water shortage leading to **water stress** and **water insecurity**.

Increasing Water Supply:

The project has encouraged greater use of **rainwater harvesting** techniques to **collect & store water**. This benefits villages & families. Methods include:

Taankas - **Underground storage** systems about 3m in diameter & 3-4m deep. They collect water from roofs holding up to 20,000 litres.

Johed - **Small earth dams** capture rainwater which sinks into the ground and **raises the water table**. Wells can then collect this water. Five rivers that used to dry up once the Monsoon passed now flow all year!

Pats - **Irrigation channels** that **transfer water** to the fields to water crops. The villager whose turn it is to receive water makes sure the channels are repaired and working properly.

Increasing Public Awareness:

Education. Communities are **educated to conserve** (protect) **water**. By working together they can conserve water and **water security is increased**. This means that problems such as soil erosion, desertification & groundwater pollution are reduced.

Funding & the NGO. The Wakel River Basin Project was **funded** by The **Global Water for Sustainability Program** between 2007-2014. This NGO was created as part of the USA's International Development Agency. This NGO has worked with local people to **increase water security & to develop sustainable solutions**. Local people have been involved in the decision-making process to make this water management scheme successful.

A Johed –
During the dry season in Rajasthan.



**Example:
Lesotho Highland
water project**

The exam paper will refer to this case study in an exam question as;
'Using an example of a large scale water transfer scheme'

Example question : Evaluate the sustainability of a large scale water transfer scheme

Key idea: Water transfer schemes move water from areas of **water surplus** (plenty of water) to areas of **water deficit** (water shortages) **Reservoirs store water**, and **rivers and pipes** are used to transfer it. It provides **water for farming** (irrigation) **power for industry** (HEP) and **water for drinking, sanitation and domestic use**. Dams also **control flooding**. Transfer **relieves water stress** but can cause both **social, (S) economic (E) and environmental (EN) advantages and problems**.

Key features of the scheme

Background – Lesotho is a small highland country in Southern Africa. It has few resources and high levels of poverty and food insecurity. It is a **LIC**. However it has **high rainfall** and a **water surplus**. It is completely surrounded by South Africa on which it depends economically.

What is the Highland water project – The scheme will transfer **2000 million cubic meters** of water per year from **Lesotho to South Africa**, to solve problems of water stress in drier regions. It will take **30 years to complete** and cost **\$4 billion**.

Key features of the scheme:

5 huge dams and reservoirs to store water
200km of tunnels to transfer water to South Africa

Roads, bridges and infrastructure

Pumping stations to pump water

A Hydroelectric power plant to generate electricity

Advantages - Lethoso

E/S - Wealth. Provides **75% of Lethoso's GDP** which can be used for development projects.

E/S - Power. Hydroelectricity will supply Lesotho with **all its energy needs**.

S - Water supply and sanitation. **Water supply will reach 90% of people in the capital Meseru** and **sanitation will be improved** from 15-20%

E/S - Transport. **New roads** will improve transport boosting travel, **trade and industry**.

Advantages – South Africa

E/S - Water supply. Will provide water to regions suffering **uneven rainfall and drought**.

S - Safe water. Will provide water to **10% of the population** without access to safe water.

EN - Pollution. Extra fresh water will **reduce problems of industrial and sewage pollution** in South Africa's Vall river reservoir, which was destroying the local ecosystem.

Disadvantages - Lesotho

E/S - Loss of homes and livelihoods. **30000 people were forced to move** from their land due to flooding from the first two dams

E/S - Loss of homes and livelihoods. A further **17 villages** will be flooded and **71 villages will loose farmland** when the next dam is constructed

EN - Habitat destruction. Habitats are lost due to flooding. Flood control on rivers downstream of dams have **destroyed a wetland ecosystem**.

Disadvantages – South Africa

E - Cost. The scheme will cost South Africa **\$4 billion**, putting strain on South Africa's finances.

E - Leakage. **40% of water is lost** through leakage, wasting huge amounts of water
E/S - Water bills. **Water bills** in South Africa to help pay for the scheme are too high for the poorest people who need the water most.

E - Corruption. **Corruption** has increased costs.