

# Learn your case studies and examples!

Examples are smaller and in less detail....

A case study is much larger and in more depth...

*Often Case Studies are made up of lots of examples*

# Case studies & Examples

## PAPER 1

|                     |                                       |                                     |
|---------------------|---------------------------------------|-------------------------------------|
| Natural Hazards     | Tropical storm                        | Hurricane Irma 2017                 |
|                     | UK extreme weather event              | The Beast from the East 2018        |
|                     | Tectonic hazards in an HIC and an LIC | Nepal 2015 (LIC) & Chile 2015 (HIC) |
| Living World        | Small scale UK ecosystem              | Epping Forest                       |
|                     | Tropical Rainforests                  | Amazon Rainforest                   |
|                     | Hot desert environment                | Sahara Desert                       |
| Physical Landscapes | Coastal management scheme             | Whitstable                          |
|                     | Section of UK coastline               | Dorset Coastline                    |
|                     | UK river valley                       | River Tees                          |
|                     | Flood management scheme               | Cockermouth                         |

## PAPER 2

|                     |                                                        |                                                                    |
|---------------------|--------------------------------------------------------|--------------------------------------------------------------------|
| Urban Issues        | NEE city                                               | Rio De Janerio (Brazil)                                            |
|                     | Improving Quality of Life for urban poor               | Favela Bairro Project                                              |
|                     | UK city                                                | London                                                             |
|                     | Urban regeneration project                             | Olympic Park, Stratford                                            |
| Economic World      | NEE- Importance, context, aid, TNCs                    | Nigeria                                                            |
|                     | Tourism to decrease the development gap                | Jamaica                                                            |
|                     | Population Growth / Decline in rural UK regions        | Outer Hebrides & Cambridgeshire                                    |
|                     | Modern industry, environmentally sustainable           | Torr Quarry, Somerset                                              |
|                     | Regional inequalities in the UK                        | North South Divide                                                 |
|                     | UK Transport improvements                              | HS2, Crossrail, Heathrow expansion, Road improvements, Liverpool 2 |
| Resource Management | Large scale water management scheme                    | China South-North Water Transfer scheme                            |
|                     | local scheme to increase sustainable supplies of water | Wakel River Basin Project - India                                  |

# GCSE Geography

|                                               |                                                                                                             | Effects                                                                                                |                                                                                          | Responses                                                                                                             |                                                                                                          |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|                                               | Facts                                                                                                       | Primary                                                                                                | Secondary                                                                                | Immediate                                                                                                             | Long term                                                                                                |
| <b>Nepal</b><br><br>GDP Per Capita = \$870    | -25 <sup>th</sup> April 2015<br>-Magnitude 7.9<br>-Collision margin Indo-Australian & Eurasian plates       | 👤 8630 deaths.<br>👤 1 million homeless.<br>💰 26 hospitals destroyed.<br>💰 500,000 buildings destroyed. | 👤 Food & water shortages<br>💰 Long-lasting loss of tourism<br>🏔️ Avalanches killed 250.  | 👤 Red Cross created temporary shelters<br>👤 UK sent 100 rescue workers<br>💰 India & China provided \$1bn              | 👤 EQ drills now carried out across Nepal<br>💰 Asian nations provided \$200 million for rebuilding        |
| <b>Chile</b><br><br>GDP Per Capita = \$15,000 | -16 <sup>th</sup> Sept. 2015<br>-Magnitude 8.3<br>-Destructive margin between Nazca & South American plates | 👤 15 deaths.<br>👤 600 homeless.<br>💰 200 buildings destroyed.<br>💰 Electricity lines damaged           | 👤 1,800 had water & power cut off<br>💰 Insurance costs increased<br>🏔️ Coastal flooding. | 👤 Army deployed to flooded areas<br>👤 Army evacuated people from coastal towns<br>💰 EQ warnings sent out across Chile | 💰 EQ & Tsunami warning systems updated<br>💰 Updated building regulations mean all buildings are EQ proof |

## Why are Earthquakes worse in LICs?

- Buildings are poorly built.
- Lower quality emergency services such as Medical care.
- Cannot afford to rebuild quickly, so longer lasting effects.
- Families have less money to repair / replace possessions.
- **HOWEVER**, total damage costs are higher in HICs as infrastructure is more expensive.

## Preparation and planning

- Chile frequently has well-equipped, so people practice drills.
- Chile has EQ proof buildings, which Nepal cannot afford.
- Chile has many experienced and well-equipped rescue teams.
- Chile has warning systems that reach all phones & TVs.



# EG of how tectonic hazards vary

# 'Hurricane Irma' 2017

## Background Detail:

**Where:** Barbuda (Caribbean).

**When:** September 6, 2017.

**Category:** 5 (highest possible on Saffir Simpson Scale)

**Context:** Hurricane Irma came 1 week after Hurricane Harvey, and 1 week before storm Jose.

## Tropical Storm Hazards:

- **Windspeeds** reaching over 150mph cause damage
- **Rainfall** brought by tropical storm causes flooding
- **Storm surge** – A coastal flood that occurs when strong winds push water towards the coast



## Climate Change & Tropical Storms

- **Rising sea levels** worsened storm surges and flooding
- **Warmer temperatures** (sea and air) generate more energy for tropical storms making storms more **intense** and **frequent**

The Caribbean islands worst-affected by Hurricane Irma



Natural hazards

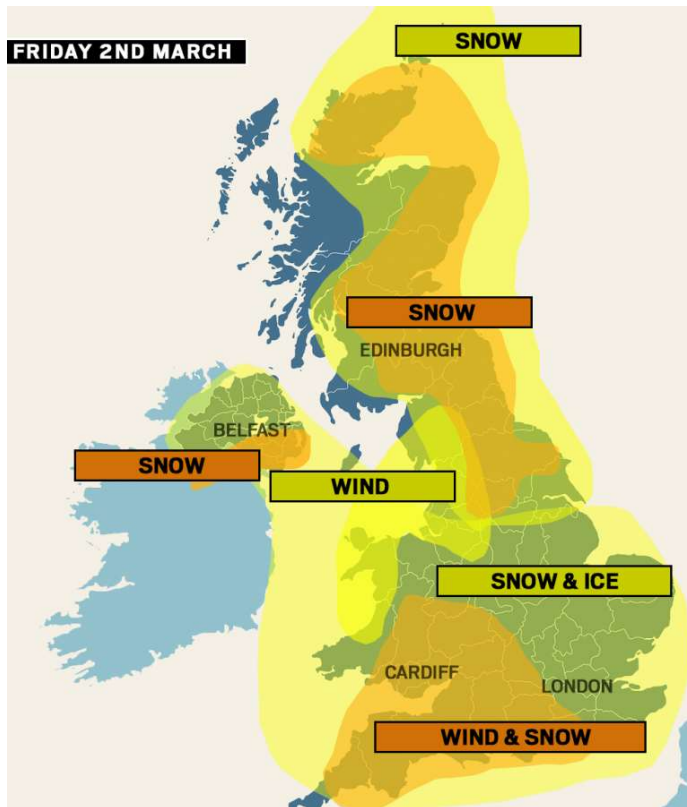
|                       | Primary Effects                                                                                                                                                                                                       | Secondary Effects                                                                                                                                                                                                                      |                            | Immediate Responses                                                                                                                    | Long-term Responses                                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Socio-Economic</b> | <ul style="list-style-type: none"> <li>• Businesses damaged</li> <li>• 90% buildings in Barbuda damaged</li> <li>• Ports &amp; Codrington Airport damaged</li> <li>• 129 deaths</li> </ul>                            | <ul style="list-style-type: none"> <li>• 60% Barbuda homeless</li> <li>• Food and water shortages for several days</li> <li>• Tourism stopped for almost a year due to damaged hotels and attractions</li> </ul>                       | <b>Effective</b>           | <ul style="list-style-type: none"> <li>• 450 shelters provided</li> <li>• Ports &amp; Codrington airport repaired quickly</li> </ul>   | <ul style="list-style-type: none"> <li>• UK gave £32 million in aid</li> <li>• Building regulations improved</li> </ul> |
| <b>Environmental</b>  | <ul style="list-style-type: none"> <li>• 15 inches of rain caused flooding</li> <li>• Storm surge flooded coastal towns</li> <li>• Many trees uprooted</li> <li>• Widespread debris from damaged buildings</li> </ul> | <ul style="list-style-type: none"> <li>• Storm Jose due to hit island 1 week after Irma</li> <li>• Farmland contaminated from debris and polluted water</li> <li>• Debris blocked access to rural towns, ports and airports</li> </ul> | <b>Partially effective</b> | <ul style="list-style-type: none"> <li>• 1,800 people evacuated</li> <li>• 1,100 UK military arrived after 2 weeks</li> </ul>          | <ul style="list-style-type: none"> <li>• Debris removed from roads</li> <li>• Hotels rebuilt</li> </ul>                 |
|                       |                                                                                                                                                                                                                       |                                                                                                                                                                                                                                        | <b>Ineffective</b>         | <ul style="list-style-type: none"> <li>• 6% power restored after 1 month</li> <li>• Food and water aid arrived after 5 days</li> </ul> | <ul style="list-style-type: none"> <li>• Insurance companies doubled their prices for Barbuda's businesses</li> </ul>   |

# EG of a tropical storm

# The Beast from the East, UK 2018

## Context:

- 24<sup>th</sup> February – 4<sup>th</sup> March 2018
- Freezing wind from Siberia met with Storm Emma over the UK.
- -5°C temperatures across UK
- 20cm of snow across UK
- Wind speeds exceeding 70mph



## National Response

- Army deployed to rescue drivers stranded on roads.
- Army vehicles used to drive NHS workers to hospitals.
- Met office issued 'Red' weather warning.
- Government criticised for reducing local council budgets which limited their ability to respond effectively.

## Impacts

### Social

- 👤 Hundreds cars stranded for 48hrs on Motorways.
- 👤 NHS cancelled non-urgent operations and clinics.
- 👤 Thousands of homes left without power.
- 👤 Schools across the country closed for up to 3 days.

### Economic

- 💷 Trainlines and roads badly damaged
- 💷 Businesses forced to close losing over £300 million
- 💷 More traffic accidents costing over £10million
- 💷 Trains & Flights cancelled

### Environmental

- 🌳 Flooding in some coastal areas
- 🌳 Higher rates of coastal erosion
- 🌳 Trees fell on roads & cars
- 🌳 Houses damaged



## Regional Response

- Community centers open for homeless people to shelter.
- Snow ploughs, gritters and tractors cleared snow on roads.
- Red Cross issues blankets to people stranded at Airports and on trains.
- Charities delivered prescriptions to elderly and vulnerable.

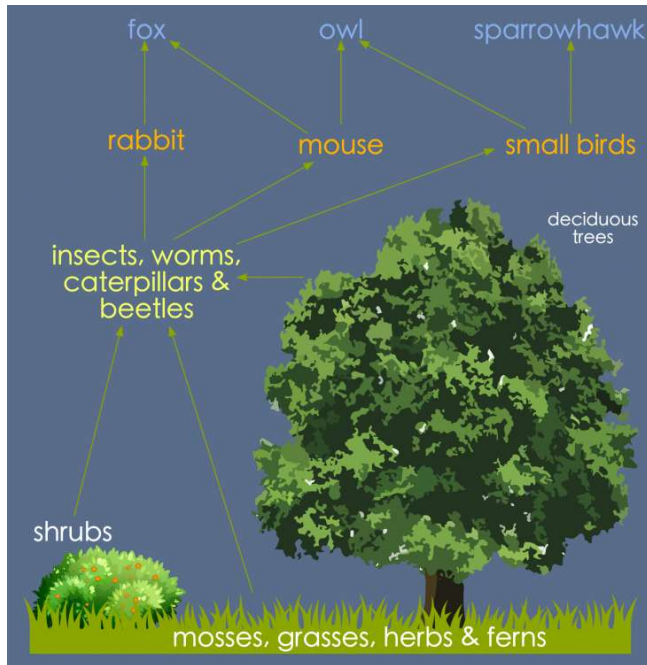
Natural hazards

# EG of a UK extreme weather event

## Background:

- North East of London.
- Deciduous forest.
- Approximately 12 miles long and 2.5 miles wide.
- Just under 2,500 hectares area.
- Epping forest is a Site of Special Scientific Interest (SSSI)
- SSSI means that it is a protected environment.
- Over 100 lakes and ponds provide essential habitats

## Epping Forest food web



## Epping Forest interdependency

- Ecosystem interdependence is the relationship between organisms in an ecosystem that rely on each other for survival.
- This includes living (plants & animals) and non-living factors (temperature, water, soils).
- Nutrients is transferred from producers to consumers and from litter back into soils to form a **nutrient cycle**.



The living world

## Consumers =

- Primary consumers** include insects, worms and beetles. (224 moth species)
- Secondary consumers** include deer, rabbits and birds (38 bird species).
- Tertiary consumers** include Owls, Sparrowhawks and Foxes.

## Litter =

- Branches fall & fruits/berries drop to provide substance to decompose.
- Berries and fruits also support some primary/secondary consumers.

## Decomposers =

- Litter broken down by beetles & fungi (700 fungi species).

## Producers =

- Deciduous trees include oak, elm, ash.
- Shrub layer consisting of holly, bracken & mosses (293 plant species).
- Adapted to UK's seasonal climate - large leaves in spring maximise photosynthesis & deciduous trees drop leaves in autumn to save energy.

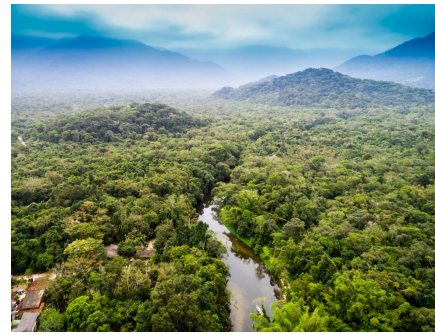


# EG of a small scale UK ecosystem



## Background:

- 🌳 South America – Mostly in Brazil
- 🌳 7 million km<sup>2</sup> (twice the size of India)
- 🌳 Since 1970, about 20% of the Amazon rainforest has been cleared
- 🌳 Habitat for 10% of the world's biodiversity
- 🌳 Home for 2.7 million indigenous people



The living world

## Causes of Deforestation

### Logging (3%)

- ✂ Generates \$2.5 billion per year
- ✂ Valuable hardwood trees e.g. Mahogany

### Illegal Logging (9%)

- ✂ Mostly done around newly built roads

### Energy Production (1%)

- ⚡ 150 hydroelectric dams in the Amazon
- ⚡ e.g. **Belo Monte Dam** provides energy for 60m people

### Mineral Extraction (2%)

- 🏠 Forest cleared for gold & iron mines
- 🏠 **Carajás Iron mine**– Largest in the world. Creates over 3000 jobs

### Growing Population (5%)

- 🏠 Amazon Population grown 25% since 2000
- 🏠 New towns built for population growth
- 🏠 Building the **Trans Amazonian Highway** to encourage growth and trade between towns.

### Farming (80%)

- 🐄 Rainforest cleared for cattle grazing and growing cattle feed.
- 🐄 70% of farming is for cattle & Soy.

## Impacts of Deforestation

### 1. Soil Leeching

Deforestation = nutrients washed away = infertile soil.

### 2. Climate Change

Deforestation = releases CO<sub>2</sub> = ↑ Enhanced Greenhouse Effect

### 3. Economic growth

Deforestation = ↑ jobs, ↑ incomes & tax = ↑ standard of living & GDP.

### 4. Negative economic

No deforestation = no businesses = ↓ jobs / GDP.

### 5. Loss of biodiversity

Deforestation = loss of habitats = 100,000 species become extinct yearly.

## Managing Deforestation

### 1. Selective Logging

Only cut down older trees & replant areas that are cut down.

### 2. International Hardwood Agreements

Businesses only purchase trees from certified organisations to reduce illegal deforestation.

### 3. Eco-Tourism

Tourism that is focused on preserving the rainforest and educating visitors about the issues around deforestation. Smaller incomes than typical tourism.

### 4. Debt Reduction

Debt relief (reducing debt) or even debt cancellation reduces the need for Brazil to cut down trees to earn money for debt repayment.

# CS of a tropical rainforest

## Background

- Stretches across many countries in northern Africa
- Sahel region to the south = Desert fringe
- Desertification is extending the Sahara into the Sahel
- 1 billion people around the world are living at risk of expanding deserts.

## Why are hot deserts extreme?

### Extreme temperatures

- Daytime temp 40°C, but freezing at night
- Too hot in summer daytime for workers or tourists.

### Water supply

- Low annual rainfall. Less than 70mm on average.
- Rain unpredictable.

### Inaccessible

- Huge areas without good roads or rail connection
- 5 days by truck to reach some mines.

### Sandstorms

- Make working conditions challenging.
- Damages expensive infrastructure.



## Opportunities

### Mineral extraction

- Oil & Gas = 60% of Algeria's GDP.
- Iron Ore in Algeria employs 40,000 workers.
- Morocco = largest exporter of phosphate (used in fertilisers).

### Energy Production

- 100km² solar farm in Tunisia = Electricity sold to other countries.
- Sahara averages 12 hours of sunlight per day
- Sandstorms can damage solar panels

### Farming

- Commercial farming limited by water shortages.
- Aswan Dam helped increase water supply in Egypt.

### Tourism

- 13m tourists visited Morocco in 2023
- Star Wars fans in Algeria & Camel trekking in Morocco
- Small scale, most tourism in cities on the desert fringe.

## Causes of Desertification

- ❖ **Deforestation** – Locals cut down trees for firewood.
- ❖ **Unreliable Rainfall** – When rainfall occurs, it leads to heavy surface run off which causes leeching of soils (washing away nutrients).
- ❖ **Climate Change** – Reducing the frequency of rainfall

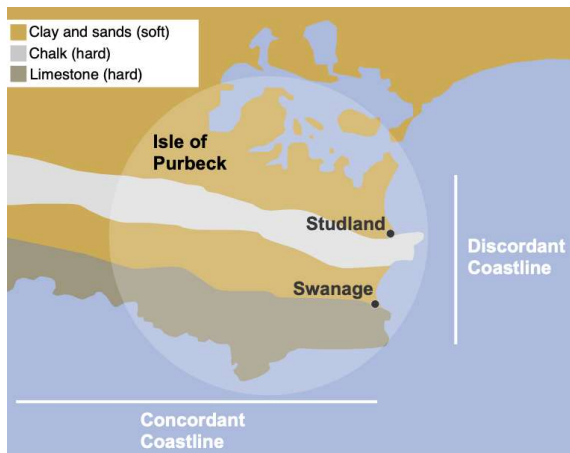
## Managing Desertification

|                                                                                                       |                                                                                                                        |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Afforestation</b> - The Great Green Wall involves Planting trees along 8000km of the Sahel region. | Trees provide shade to soils and creates a healthy nutrient cycle so that soils are fertile. Trees cause more rainfall |
| Use of <b>appropriate technology</b> - Give locals cookers that do not require wood to work.          | People do not need to cut down trees, so less deforestation occurs                                                     |
| <b>Aswan Dam</b> – Costing £1bn and finished in 1970.                                                 | Provides a reliable water supply to Egypt all year round                                                               |

# CS of a hot desert

# Dorset's Jurassic coast

UK  
physical  
landscapes



Along the east coast, the alternating layers of hard (chalk) & soft rock (Clay) have eroded, creating Swanage **bay** & Ballard Down **headland**.

On Ballard Down Headland, **stacks & stumps** that have formed at the tip of the chalk headland, known as *Old Harry Rocks*.

In Studland bay, deposition has created **beaches** and 5km of **sand dunes**.

At Lulworth, a **cove** has formed where waves have broken through a weakness in the limestone **cliffs**.

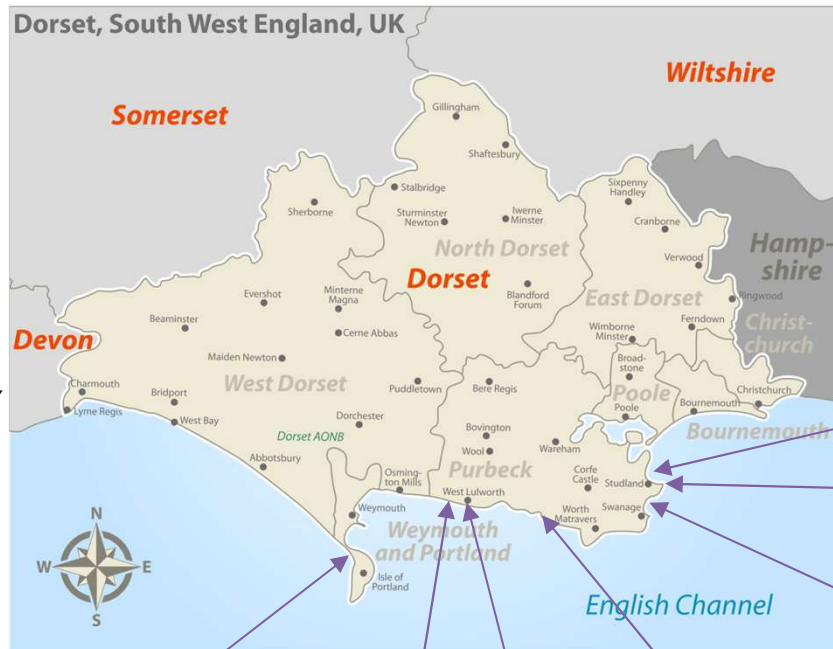
Durdle Door is an **arch**, formed from a layer of hard limestone cliff stretching out to sea.

The waves at Kimmeridge bay have eroded the base of the **cliffs** causing them to collapse and leaving behind a **wave cut platform**.

Longshore drift has created Chesil Beach - a pebble and shingle **spit** that connects to the isle of Portland forming a **tombolo**.

## Background

-  Dorset Coastline, South UK
-  Part of Jurassic coast (96 miles)
-  Discordant Coastline made up of clay, chalk & limestone
-  Concordant Coastline made up of Limestone
-  Jurassic Coast is a UNESCO World Heritage Site for its outstanding beauty, fossils and landforms.



Chesil Beach

Durdle Door

Lulworth Cove

Kimmeridge

Studland Bay

Ballard Down

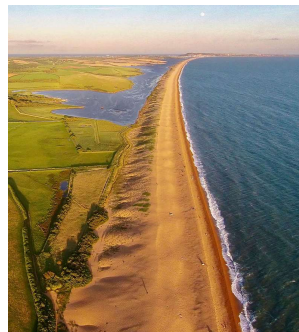
Swanage Bay



Studland Bay - Beach & Sand Dunes



Ballard Down / Old Harry Rocks - Stacks & Stumps



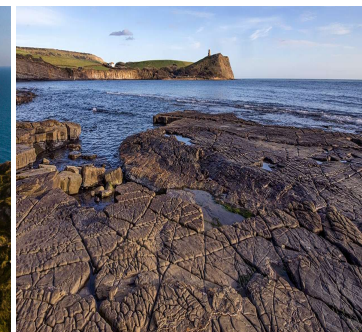
Chesil Beach - Spit/Tombolo



Durdle Door - Arch



Lulworth - Cove



Kimmeridge - Wave Cut platform

# EG of landforms along the UK coastline

## Background

- 🏠 South-East UK.
- 🏠 Kent Coastline.
- 🏠 Tourism economy.
- 🏠 Large shingle beach.

## Why is Coastal Management needed?

- 🏠 Protecting the town from flooding.
- 🏠 Whitstable flooded in 2013 after a storm.
- 🏠 Longshore drift removes 12,000m<sup>3</sup> of beach each year.
- 🏠 10,000 people live in areas at risk of flooding.



## Coastal Management Strategies

### **Soft Engineering Strategies:**

- Beach replenishment in 1989 & 2006.
- 70,000m<sup>3</sup> of shingle was added to the beach.

### **Hard Engineering Strategies:**

- Whitstable seawalls were built in the 1950s.
- 3.5 km of Sea Wall
- Groynes along 10km of beach to restrict longshore drift.
- 150m reinforced seawall protects railway.

## Effects of Coastal Management

- ✓ Expanded beaches = ↑ tourists = ↑ economy.
- ✓ Flood protection = ↓ damage to property.
- ✓ Sea Wall ↑ accessibility along the coast.
- ✓ ↓ Insurance costs for businesses.
- ✗ £2 million spent on groyne repairs in 2022
- ✗ Sea rise = ↓ effectiveness of defences = ↑ costs

## Long term future

- Predicted rise in sea level is 1m by 2100.
- Groynes need to be raised every 10-20 years.
- Sea Walls need to be increased in height by 1.5m by 2100 as sea levels rise.



# EG of a coastal management scheme

# River Tees

UK  
physical  
landscapes

## Background

- Located in the north of England.
- River flows 85 miles east.
- **Source** is called *Cross Fell* in the Pennines Mountains.
- **Mouth** is on the East coast into the North Sea.

## Upper Course Features

The River Tees flows over hard rock (*Whinstone*) in its upper course and has formed **V-shaped valleys** & **interlocking Spurs**.

With a 20m drop, **High Force waterfall** is the UK's largest and formed as the River Tees flows over hard rock (*Whinstone*), above a layer of soft rock (*sandstone*).

## Middle Course Features

As the River Tees reaches its middle course, lateral erosion creates a wider river channel and **meanders**.

**Oxbow lakes** have formed in some areas where two meanders have eroded towards each other.

## Lower Course Features

**Floodplains** and **Levees** have formed from previous floods along the River Tees' middle & lower course.

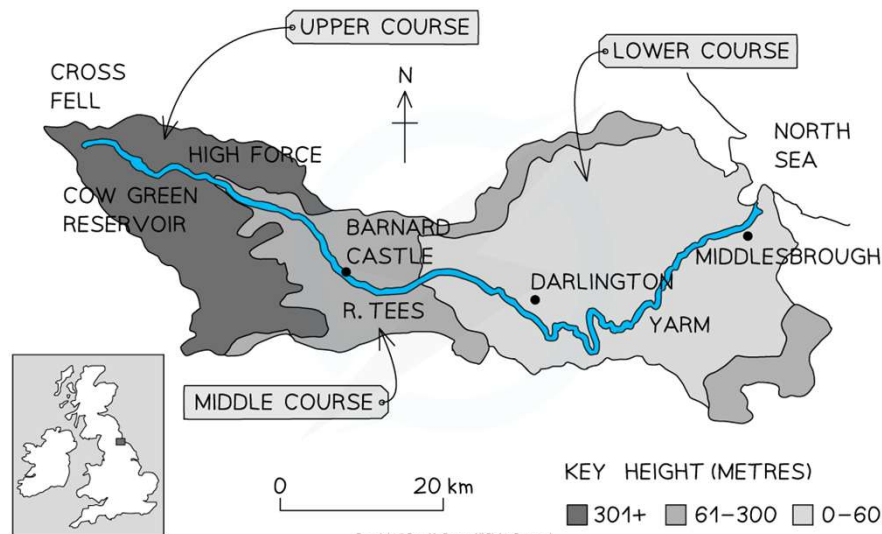
The River Tees's mouth has a large **estuary** with **mudflats**.



High Force Waterfall



Tees Estuary & Mudflats



V-shaped valleys & interlocking Spurs



Floodplain & Levee

Meanders & Oxbow Lakes



EG of a UK river valley

## Background

- Cockermouth is located in the north of England.
- Situated between the River Cocker and River Derwent.
- Cockermouth flooded in 2008, 2009 & 2015

## Impacts of 2015 flood

- Water levels in the town reached 8.2ft (2.5m)
- Over 5,500 homes and 1,000 businesses were flooded
- 200 people were rescued by emergency crews.
- Damage to infrastructure e.g. roads.
- Total damages of £276 million
- The Cumbria Flood Recovery Appeal raised £10.3 million to help those affected.

## Cockermouth River Management Scheme

- Additional 400 homes & businesses protected.
- Scheme cost £4.4 million.

## Cockermouth's flood risk - 2015

- Town located on confluence of two rivers.
- Steep slopes surround the town.
- Storm Desmond brought wind & rain
- 36 hours of intense rainfall (450mm fell)
- Rivers hadn't been dredged in years



| Hard engineering                                                                                                                                                         | Soft engineering                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 500 meters of raised <b>embankments</b> & 1.2km of <b>flood wall</b> that increases the capacity of the river.                                                           | <b>River Restoration</b> - Restored 350 hectares of flood plains around Cockermouth.       |
| 9 <b>flood relief channels</b> that allow water to be diverted from the river channel if needed.                                                                         | <b>Flood warnings</b> - 62% of population to get texts warning of potential floods coming. |
| <b>Flood barrier:</b> A 120-meter barrier that rises automatically when the river floods, allowing protection without ruining views of the river when it's not flooding. | <b>Afforestation</b> - 2000 trees planted to increase interception.                        |
|                                                                                                                                                                          | <b>River Management</b> – Rivers now dredged regularly to increase capacity.               |

# EG of a flood management scheme

# PAPER 2

## Location and background:

- 🌐 South-East of Brazil, on Atlantic coast
- 🌐 Built around Guanabara Bay
- 🌐 Population of 6.5 million in Rio
- 🌐 Population of 12.5 mill in surrounding urban areas
- 🌐 2<sup>nd</sup> largest city in Brazil

## International importance:

- ❑ Hosted 2016 Olympic Games & 2014 World Cup
- ❑ International transport hub (5 ports & 3 airports ✈)
- ❑ One of the most visited cities in the southern hemisphere
- ❑ Attractions include Sugarloaf Mountain, Copacabana beach, & Statue of Christ the Redeemer.
- ❑ Major international films set in Rio de Janeiro

## National importance (Brazil):

- 🇧🇷 Oil, mining and TNC HQs based in Rio
- 🇧🇷 Famous universities + research centres
- 🇧🇷 Creates 5% of Brazil's GDP
- 🇧🇷 Port important for imports & exports e.g. iron ore
- 🇧🇷 65% of Brazil's film industry based in Rio

## Regional importance:

- 🏙 Provides schools, universities, jobs, leisure...
- 🏙 Thriving arts and cultural scene
- 🏙 Major transport hub



## Urban growth in Rio

- 👤 Since 1950, population has trebled

## Causes of Urban Growth:

- 👤 **Migration** has caused 65% of the population increase in Rio.
- 👤 Migrants attracted by jobs.
- ✈ Both from Brazil (rural-urban migration) & other countries e.g. China
- 👤 **Natural increase** caused by falling death rates and high birth rates

## Urban Sprawl:

- Rapid rural-urban migration has led to many favelas being formed on the steep hills surrounding Rio.
- 25% of Rio's population live in Favellas
- Rocinha, in the South Zone, is the largest Favela in Rio with a population estimated to be between 150,000 and 300,000.

## Inequalities in Rio:

- ❖ Rapid urban growth has led to: **Increasing wealth** for residents, **improved Infrastructure** and higher **Standards of living**.
- ❖ However, this does not mean that all parts of Rio are improving and there is significant inequalities between Favelas and the remaining neighbourhoods in Rio.

## Opportunities and Challenges in Rio:

- 🌐 Rapid Urban Growth has led to many opportunities for people moving into the city.
- 🌐 However, there are significant challenges for the government and for the poorest in Rio's favelas.
- 🌐 Favelas have been created as population growth has led to a huge shortage of housing.

### Opportunities in Rio:

#### Water supply:

- 95% of Rio's planned areas have running water.
- 300km of water pipes improved.

#### Energy supply:

- 60km new power lines installed.
- New Hydro-Electric Power complex ↑ supply 30%.

#### Healthcare & Education:

- Falling infant mortality and rising life expectancy.
- Has 12 universities.

#### Economy & Employment:

- Home to many TNCs and tertiary industry jobs.
- Large investment into infrastructure by gov.

### Challenges across Rio:

#### Water Pollution:

- × 200 tons of raw sewage & 50 tons industrial waste pollutes Rio's bay's each day.

#### Congestion:

- × 40% increase in traffic over the last decade makes Rio the most congested city in South America.

#### Air Pollution:

- × Air pollution causes over 5000 deaths per year.

## Challenges in Rio's Favelas:

#### Water supply:

- 12% of Rio's favelas have running water.
- 37% of water lost to leaks in infrastructure

#### Energy supply:

- Power cuts frequent due to shortages.
- Favelas illegally tap the supply (risky, unsafe)

#### Healthcare & Education:

- Only 55% of favelas had a family health clinic.
- Only 50% continue education after the age of 14.

#### Economy & Employment:

- 20% unemployment in favelas.
- 1/3 work in informal sector (poor pay, & Government receives no tax).

#### Housing:

- Most houses in Favelas are illegally built by the residents.
- Rio does not provide rights to illegally built favelas.
- This means there is limited provision of services e.g. waste collection



## Challenges in Rio's Favelas

- Rio's "urban poor" live in the many favelas that have been illegally built on the steep slopes around the city.
- Rio's government did not recognise favelas as legal houses & invested very little into their services or infrastructure.
- This is now changing as charities & the government are working together to improve conditions in favelas.
- The **Favela Bairro Project** aims to improve quality of life for those in the **Complex do Alemão** favela by reducing the problems.

## Favela Bairro Project

- Favela improvement project starting in the 1980s
- Based in the **Complex do Alemão** Favela in Northern Rio.
- Favela's population is 26,000
- By 2005, improvements had been made in approximately 100 more favelas across Rio.



## Favela Bairro Project Strategies

| Strategy                                                                                                                                   | Improved Quality of Life                                                                | Limitation                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Self-help schemes:</b><br>Providing building materials like concrete for residents to use to improve building standards.                | Improves the quality of houses so they are stable & can connect to water & electricity. | Does not improve the layout of favelas e.g. their narrow roads or lack of sanitation. |
| <b>Legal rights:</b><br>Legal rights given to properties, making houses formally recognised by the city's government.                      | Houses are entitled to government services and water & electrical connections.          | Forces homeowners to pay taxes, which they may not be able to afford.                 |
| <b>Education:</b><br>Adult literacy programmes funded for the residents.                                                                   | Improves education of adults to improve skills.                                         | Still very little formal employment opportunities in favelas.                         |
| <b>Relocation:</b><br>Some residents relocated to a new town called <b>Barra da Tijuca</b> , built 20km outside Rio.                       | Residents are provided with a formal residence that is good quality.                    | Being 20km away, Residents may not be able to travel to their jobs or family.         |
| <b>Transport improvements:</b><br>In 2011 a cable car system was built that connected <b>Complex do Alemão</b> to Rio's business district. | Allows people to travel from the favela to formal employment.                           | Hugely expensive & only connected one favela to business district.                    |

Strategy to improve Quality of Life for urban poor

## London's Context:

- 🌐 South-East England
- 🌐 Built around the River Thames
- 🌐 London is the largest urban area in the UK
- 🌐 Population of 8.9 million people

## International importance:

- 🌐 Major transport hub (Heathrow, Eurostar)
- 🌐 Global financial hub (271 TNC HQs)
- 🌐 Tourism (Royal family, Olympics)
- 🌐 Home of government

## National Importance:

- 🏰 Capital city
- 🏰 Port (River Thames)
- 🏰 Cultural opportunities (West End, Palace)

## Migration in London:

- 40% of residents not born in the UK.
- 18 & 19-year-olds move out of London for university.
- People in their early 20s move in to start their careers.

## Impacts of migration on London:

- Younger average population than rest of UK.
- Large cultural mix.
- ✓ Cultures celebrated e.g. Notting Hill Carnival
- ✓ Culture brought to London in music, art & food.
- ✗ Population growing rapidly.
- ✗ Pressure on services e.g. Transport

## Opportunities in London

### Recreation and entertainment

- 👤 Museums & West End theatres
- 👤 Landmarks e.g. Buckingham Palace
- 👤 Sports & Nightlife

### Employment

- 💰 Banking = highly skilled workforce
- 💰 Largest contributor to UK economy

### Integrated Transport

- ✈ Transport systems link to increase the use of public transport.
- ✈ TfL serves 272 stations and 27 million trips per day
- ✈ Major investments in transport connections (e.g. Crossrail)

### Urban Greening

- 🌳 London is one of the world's greenest cities.
- 🌳 **47%** of London is green space.
- 🌳 There are 8.1 million trees, almost one per person



# Case Study of a UK city

## London's Urban Growth:

- 🌐 London is the largest urban area in the UK
- 🌐 Population of 8.9 million people
- 🌐 By 2030, London will have become a megacity.
- 🌐 Increased number of housing causes urban Sprawl

## Urban Change in London:

- 🌐 Increased number of housing built on rural-urban fringe
- 🌐 Transport developments
- 🌐 Increasing population
- 🌐 Greater ethnic mix caused by migration
- 🌐 Change in industries (more tertiary)
- 🌐 Deindustrialisation (less secondary)
- 🌐 Regeneration of brownfield sites
- 🌐 Urban Greening

## Opportunities from Urban Change:

- 🌐 Regeneration brings improvements (next slide)
- 🌐 Migration brings cultural opportunities
- 🌐 More tertiary industry brings higher incomes
- 🌐 Urban Greening improves air quality and wellbeing



## Challenges from Urban Change:

### Growing population

- 👤 Higher inequalities.
- 👤 Housing shortages causing high prices.
- 👤 Increased pressure on services e.g. healthcare & transport.

### Industrial change

- 🏭 Deindustrialisation left parts of London in decline.
- 🏭 Areas of brownfield site left after industry closes.

### Transport

- ✈ Improvements in public transport needed to reduce congestion.
- ✈ Demand for public transport will grow by 60% by 2050.
- ✈ Air pollution from congestion causes around 4000 deaths per year.

### Waste Disposal

- 🗑 London produces around 7 million tonnes of waste annually

### Housing

- 🏠 Housing is built on the rural-urban fringe, replacing greenspace.
- 🏠 House prices are around 60% higher than UK average.

### Inequalities

- 👤 Parts of London are significantly more deprived than others:

| Measure of Deprivation                      | Kensington & Chelsea | Newham |
|---------------------------------------------|----------------------|--------|
| Male Life Expectancy                        | 83.7                 | 75.7   |
| Female Life Expectancy                      | 87.8                 | 79.8   |
| Unemployment                                | 3.9%                 | 9.4%   |
| Pupils getting 5+ Good GCSEs                | 80%                  | 62%    |
| Households with income of less than £15,000 | 9%                   | 26%    |
| Households with income of more than £60,000 | 26%                  | 7%     |

# Case Study of a UK city

## Why did Newham need regeneration?

- Newham in East London was a former industrial area.
- Deindustrialisation in the 1980s led to the docklands closing.
- This led to a **reverse multiplier effect** & **urban decline**.
- Area became one of the most deprived parts of London.

## Urban Problems in Newham:

- 🏠 Lots of derelict land
- 👤 Lack of Job opportunities
- 🏠 Poor housing
- 👤 Low life expectancy
- 👤 Low education outcomes
- 🌳 Polluted rivers & greenspace

## Urban problems managed:

- 🏠 **Westfield** = Built on derelict land = Attracts new businesses
- 👤 **East Village** = Better quality housing = Improved standard of living
- 🏠 **Here East** = High value industry = Creates skilled jobs
- 🏠 **Olympic Stadium** = Attracts people = Money spent in area
- 👤 **Chobham Academy** = Improved education = More skilled population
- 🌳 **Olympic Park** = Improved greenspace = Reduced levels of pollution

## Limitations of Regeneration:

- 🏠 Housing became too expensive for locals
- 👤 Low skilled population cannot get jobs at Here East
- 🏠 Local businesses cannot compete against Westfield



Urban issues and challenges

## Features of the Regeneration:

**Queen Elizabeth Olympic Park** With over 100 hectares of open space, this is the largest new park in London for over a century.

**East Village** The new name for the Athletes' Village, it now provides 2,800 homes for local people and newcomers.

**Here East** The new name for the Media Centre is now a hub for creative and media industries with 5,000 jobs.



**Westfield Stratford City** Not really part of the Olympic legacy, but next door to the park and employs 10,000 people.

**Olympic stadium** the new home of West Ham United FC but still an athletics stadium in the summer.

**Chobham Academy** A new secondary school built for 1,800 local children on the edge of the Olympic Park.

# Urban Regeneration Project

## Location

Located in the northern hemisphere. It is on the west coastline of Africa, with the Atlantic Ocean.

## Global importance

- NEE- 21<sup>st</sup> largest economy in the world
- World's highest GDP growth for 2010-15
- Supplies 2.7% of world's oil (12<sup>th</sup> largest)
- GDP per capita= \$5680

## Regional importance (Africa)

- 🌐 Fastest growing economy in Africa
- 🌐 Highest GDP in Africa
- 🌐 Largest population in Africa >182 million

## Political context

- 📅 Gained independence (UK) in 1960
- 📅 Civil war 1967-1970
- 📅 Stable government since 1999
- 📅 Strong trade links with China & USA

## Social context

- 👤 Literacy Rate 77%
- 👤 Life expectancy 52 years
- 👤 60% of Nigeria have electricity.

## Cultural context

- 🎵 Music Industry
- 🏈 Football (3x winner African cup)
- 🎬 Nollywood (2<sup>nd</sup> largest film industry)



## Nigeria's rapid development

After gaining independence in 1960, Nigeria's economy began to grow rapidly. This has resulted in the following changes:

1. **Rapidly growing populations**
2. **Rapid urbanisation** (% of population living in cities)
3. **High rate of Economic growth and Increasing wealth.**
4. **Improving health care and education & Infrastructure.**
5. **Improving Quality of Life** with more people having access to amenities such as clean water, reliable food, and basic sanitation.

However, this does not mean that all parts of a country are improving and there is significant inequalities between regions, especially between urban and rural.

## Nigeria's economic Development

|             | Primary | Secondary | Tertiary |
|-------------|---------|-----------|----------|
| <b>1999</b> | 67%     | 11%       | 22%      |
| <b>2023</b> | 23%     | 33%       | 42%      |

# Case Study of a NEE

## Why is Aid needed in Nigeria?

- 💰 Uneven development between Urban & Rural Nigeria
- 💰 60% of population live in poverty
- 👤 Rural Nigeria has high birth rates, high infant mortality rate and low life expectancies.
- 👤 Rural Nigeria has limited access to safe water, sanitation, or reliable electricity

## What Aid is given in Nigeria?

- Millions in North-East Nigeria, require humanitarian assistance due to conflict and food insecurity.
- The US invested over \$600 million in health assistance, including efforts to prevent malaria, end HIV, and deliver vaccines.
- UK has provided over £38 million in humanitarian assistance in the North-East



Aduwan Health Centre

- Located in rural Northern Nigeria
- ActionAid raised funds to make a new health clinic in 2010.
- This community did not have a health care centre
- Region has high rates of high infant mortality and HIV/AIDS.
- Vaccinates children against polio and other diseases.
- Reduced development gap in health between urban and rural Nigeria.

## Shell in Nigeria

- Oil discovered in 1958
- Shell – one of largest oil companies
- Controversially operates in Niger Delta
- Oil shipped to Europe

### Advantages

- ✓ Major contributor 💰 from taxes / revenue
- ✓ 65,000 direct jobs
- ✓ 250,000 further indirect jobs
- ✓ 91% contracts given to Nigerian companies
- ✓ Drives multiplier effect



### Disadvantages

- ✗ Damage of wetland ecosystem in Niger delta
- ✗ Spills damage farmland = water pollution + lost crops
- ✗ Gas released = global warming + air pollution
- ✗ Oil pollution kills fish = fishermen lose income

## Unilever in Nigeria

- Started operations in 1923
- In 2014, voted second best place to work in Nigeria
- Manufacture soap using locally-produced palm oil

### Advantages

- 💰 Currently employs 1,500 people
- 💰 Stimulates growth of local businesses
- 💰 A major contributor to Nigeria's economy
- 👤 Unilever has an ethos of social responsibility towards their factory locations, promoting improvement in health care, education and water supply.
- 🏠 It promotes environmental stewardship and claims that its palm oil comes from sustainable sources.



# Reducing development gap in Nigeria

Changing economic world



## Jamaica context

- Coastal towns more developed than towns inland.
- 17% of population live in poverty.
- GNI per capita risen from \$3,500 in 2000 to \$6,800 in 2023.

## Tourism in Jamaica

- 3.5 million visitors in 2023.
- 1.26 million of these were cruise ship passengers.

## Benefits

- Creates 175,000 direct jobs & 350,000 indirect jobs.
- 20% of jobs rely on tourism.
- Tourism creates 30% of Jamaican GDP.
- Electricity & water infrastructure improved for hotels.
- New ports built to encourage more cruise ships.

## Disadvantages

- Many jobs are seasonal & minimum wage (£71 per week).
- Tourists damage habitats.
- Jamaica has lost 50% of its Coral since 1970.
- Cruise ships cause major water pollution.



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economic world

## How does tourism reduce the development gap?

- Tourism creates Tax → Gov improves services (e.g. healthcare) → Higher life expectancy
- Tourism creates Jobs → higher incomes → More disposable incomes
- TNCs build resorts → Improved infrastructure (e.g. sanitation) → Standard of living rises
- Tourists spend money → Multiplier effect → GDP grows
- Hotels trade with businesses → local companies grow → jobs created

## How has tourism created regional inequalities in Jamaica?

- Cruise ship passengers rarely leave port towns so rest of Jamaica's towns do not benefit from jobs or tourists spending.
- Government improves infrastructure in tourism areas more than non-tourism areas.
- Rural areas often lack access to quality infrastructure, including roads, water, sanitation, and electricity, which limits access to healthcare and educational facilities.



# Tourism to decrease development gap

## What is sustainability?

Becoming sustainable means taking actions to reduce problems whilst making sure these actions do not create new problems

## What is Torr Quarry?

- 💰 Limestone quarry in Mendip Hills
- 👤 Over 100 people employed
- 💰 Creates £15 million to local economy per year
- 💰 Produces 8 million tonnes limestone per year

## How did Torr Quarry become more sustainable?



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| What was unsustainable?                      | Action                                                                | Link to sustainability                                        |
|----------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------|
| Damage to habitats                           | Restored old pits to create wildlife lakes                            | Rebuilt habitats and increased biodiversity                   |
| Landscape damaged                            | Deepen quarry instead of widening it                                  | Less damage to environment and biodiversity                   |
| Unattractive to local residents and visitors | 200 acres landscaped with trees and vegetation                        | Makes quarry more attractive, reducing visual pollution       |
| Quarry caused air and water pollution        | 10 stations monitoring noise pollution, air emissions & water quality | Ensures immediate action taken to reduce sources of pollution |
| Lorries caused congestion & noise pollution  | 75% of limestone now transported by rail                              | Minimises impact on locals (traffic), better for environment  |

## How can other industries become more environmentally sustainable?

- 🏠 Install solar panels & use renewable energy
- 🏠 Reduce waste by recycling
- 🏠 Increase green space (e.g. grass roofs)
- 🏠 Use ethically sourced materials and companies
- 🏠 Increase regulations and awareness
- 🏠 Encourage use of public transport



# Sustainable industry in the UK

## Rural change in the UK

Some rural areas in the UK are experiencing population growth whilst others are facing population decline. Both bring opportunities and challenges that need to be managed.



### Population decline in the Outer Hebrides?

- 10% decline
- 26% people aged 65 and over
- Young leave for University
- Lack of job opportunities
- Limited leisure & recreation

#### Challenges of population decline in the Outer Hebrides

|                                                                                       |                                                                                                          |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Skilled labour shortages</b> in several sectors including in education and health. | <b>Local services close</b> , e.g. bus routes, Post Offices & libraries due to lower demand and funding. |
| The birth rate reduces, as an <b>ageing population</b> is left behind.                | <b>House prices decrease</b> as there is less demand for homes.                                          |

#### Opportunities of population decline in the Outer Hebrides

|                                                                        |                                                               |
|------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>House prices are cheaper</b> for people that do move into the area. | <b>Lower crime rates</b> , especially with less young people. |
|------------------------------------------------------------------------|---------------------------------------------------------------|



### Population growing in Cambridgeshire

- 20% population growth since 2000
- Young come for University
- Many hi-tech job opportunities
- Vibrant leisure & recreation
- Excellent transport links to places like London

#### Challenges of population growth in Cambridgeshire

|                                                                                   |                                                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>House prices increasing at 18% per year</b> as there is more demand for homes. | <b>pressure on local public services</b> like schools, healthcare and education as population rises. |
| <b>Increasing number of vehicles</b> causing congestion and air pollution.        | <b>Housing developments</b> greenfield sites lead to a loss of community spirit & habitats           |

#### Opportunities of population growth in Cambridgeshire

|                                                                    |                                                                                                                  |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Multiplier effect</b> leads to economic growth and higher wages | <b>39% of Cambridge graduates stay in the area</b> creating a highly skilled workforce that attracts investment. |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|

Changing  
economic world

# Population growth/decline in rural areas

## What is the North-South divide?

The disparities (differences) in wealth, health, education & infrastructure between the south of England and the North of the UK.

## North-South divide data

| Indicator                    | North UK                                                                   | South UK           |
|------------------------------|----------------------------------------------------------------------------|--------------------|
| Life Expectancy              | 77.2 years                                                                 | 80.1 years         |
| Students going to University | Children in the South-East are <b>57% more likely</b> to go to university. |                    |
| Average incomes              | £700 per week                                                              | £850 per week      |
| Unemployment                 | 5%                                                                         | 3%                 |
| Government spending          | £8,125 per person                                                          | £12,147 per person |

## Causes of the North-South divide

### 🌐 Globalisation

Cheaper competition from NEEs in primary & secondary industries sold products for cheaper than UK industries.

### 🏭 Deindustrialisation

Primary and secondary industries closed down as natural resources ran out and companies moved abroad. Most primary & secondary industries that closed were located in the North of the UK.

### 🏛️ Government policies

Governments promoted closure of primary industries (e.g. coal mining) and encouraged the growth of tertiary industries – this growth in tertiary was mainly around London (e.g. Finance)



## Reducing the North-South divide

### The Northern Powerhouse Scheme:

A collection of policies designed to *improve transport, attract investment, and promote trade* between northern cities to boost GNI. **Policies include:**

|                                                                            |                                                                               |                                                                                  |                                                                                |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>Salford Media City science park built for companies such as the BBC</b> | <i>Created 7500 quaternary industry jobs &amp; partners with Universities</i> | <b>Subsidies given to manufacturing industries currently in Northern England</b> | <i>Makes it less likely that these companies will close in the future</i>      |
| <b>Transport improvements (see next slide)</b>                             | <i>Reduce congestion, increase trade &amp; create jobs</i>                    | <b>£6 million to support Maths teaching across the North</b>                     | <i>Improves outcomes and promotes a more skilled workers</i>                   |
| <b>Providing 30hrs free childcare per week in Wigan</b>                    | <i>Allows parents time to work &amp; saves families money</i>                 | <b>£5bn to bring hi-speed internet across the UK</b>                             | <i>Provides essential infrastructure that will attract tertiary industries</i> |

# Regional inequalities in the UK

## Transport developments to reduce the North-South Divide

Connecting major cities in the northern areas of the UK will increase trade between them, causing a multiplier effect and creating jobs.

Currently, there is very little rail connections between many northern cities, or it is unreliable and expensive.

This means people drive, causing significant congestion in the North.



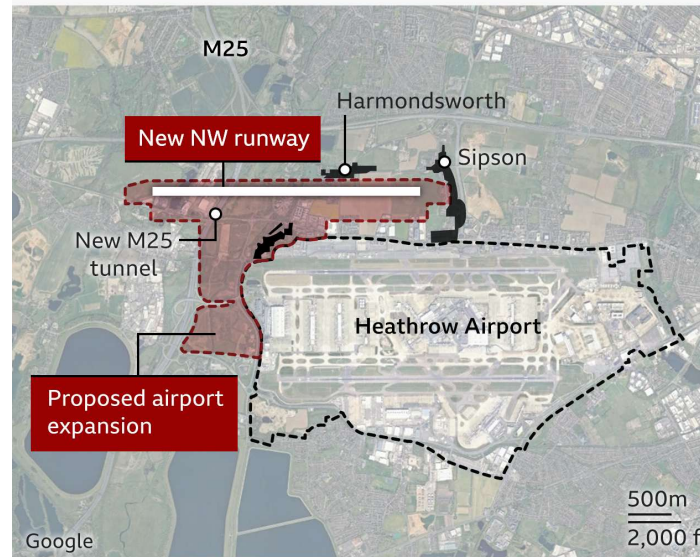
| EXAMPLE                                                                                                                 | ADVANTAGES & DISADVANTAGES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Port Expansions</b><br><u>Liverpool2</u><br><br>Building one of Europe's most advanced container terminals           | <ul style="list-style-type: none"> <li>✓ Increases freight that can be managed</li> <li>✓ More imports and exports to North of UK</li> <li>✓ Creates 5000 jobs, both temporary and long term</li> <li>✓ Attracts new businesses to the North</li> <li>• Increase in water &amp; air pollution</li> <li>• Costing £400 million</li> </ul>                                                                                                                                                                                                                                                                                                  |
| <b>Rail Improvements</b><br><u>High Speed Rail 2 (HS2)</u><br><br>Connects London, Birmingham, Sheffield and Manchester | <ul style="list-style-type: none"> <li>✓ Connecting North UK and South UK allows far more trade between cities</li> <li>✓ Reduces pressure on roads whilst significantly reducing travel times</li> <li>✓ Creates thousands of jobs and estimated to add £40bn to the UK Economy</li> <li>• Estimated cost of HS2 has risen to £98bn.</li> <li>• Rail routes will be built on greenfield sites</li> <li>• <b>Second phases (connecting the Midlands &amp; Northern regions) was cancelled due to costs.</b></li> <li>• <b>Now HS2 benefits may only be around London and not the North – increasing the North-South Divide</b></li> </ul> |
| <b>Rail Improvements</b><br><u>Northern Powerhouse Rail</u><br><br>New rail links between Northern cities.              | <ul style="list-style-type: none"> <li>✓ Connecting Northern cities allows far more trade between them.</li> <li>✓ Reduces pressure on roads whilst significantly reducing travel times</li> <li>✓ Creates thousands of jobs</li> <li>• Costing around £39 billion</li> <li>• Cost of train tickets has increased by 5%</li> </ul>                                                                                                                                                                                                                                                                                                        |

## Importance of transport developments

Transport infrastructure is important because it improves economic growth, through connecting cities, reduces costs for transport and reduces costs for businesses and individuals – if built and managed effectively.

Infrastructure is essential for goods and services to be both imported and exported.

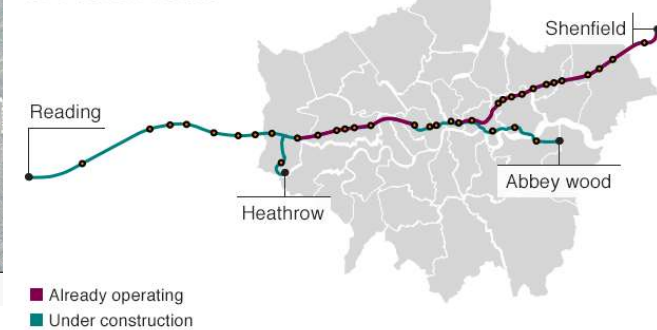
### Proposed third runway at Heathrow



Source: Heathrow Airport Expansion Consultation



### Crossrail route



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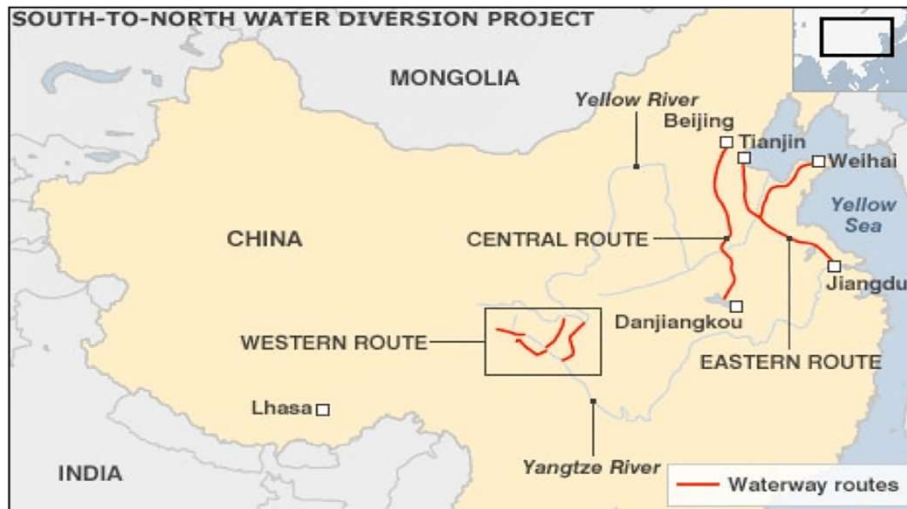
| EXAMPLE                                                                            | ADVANTAGES & DISADVANTAGES                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>New Runway at Heathrow</b>                                                      | <ul style="list-style-type: none"> <li>✓ Could boost the UK Economy by £200bn</li> <li>✓ Supports 76,000 jobs</li> <li>✓ Makes Heathrow one of the most important airports in the world</li> <li>• Cost £18.6bn</li> <li>• Noise and air pollution for residents around Heathrow will be large</li> </ul>        |
| <b>London Crossrail</b><br>Connects Reading, Heathrow, central London and Essex.   | <ul style="list-style-type: none"> <li>✓ Reduces journey times across London</li> <li>✓ 200 million passengers per year</li> <li>✓ Brings additional 1.5 million people within 45mins of London</li> <li>• Cost \$15bn</li> <li>• Only benefits SE UK, which is already the wealthiest part of the UK</li> </ul> |
| <b>Road Investment Strategy</b><br>Announced in 2014 aims to improve road capacity | <ul style="list-style-type: none"> <li>✓ Creating thousands of jobs</li> <li>✓ Smart Motorways improve safety and reduce congestion</li> <li>• Cost £15bn</li> <li>• Widespread delays and congestion caused by construction</li> </ul>                                                                          |

### What?

- South-to-North Water Transfer Project
- Largest inter-basin scheme in the world
- Started in 2002
- Cost \$80 billion project
- From Yangtze to the Yellow River basin

### Why is it needed?

- Growing water shortages in Beijing and the northern province (densely populated)
- China has 20% of the world's population but only 7% of its freshwater
- Citizens have just 2000m<sup>3</sup> (less than a 1/3 global average)
- North soil degrading = x farming



### Advantages

- Over 45 billion m<sup>3</sup> of water are diverted to the north to supply people and industry
- When completed they 'claim' 500 million people will benefit
- Key to unlocking development in the north

### Disadvantages

- These were unintended....
- 350,000 people were resettled from the Hanjiang Valley for the Danjiangkou Reservoir
- Over \$2 billion spent on pollution prevention projects
- In times of drought (2011) not enough water in south.
- Some water diverted from the Yangtze is of low water quality and human waste

## EG of large-scale water transfer scheme

### Where?

- Rajasthan region in North West India
- Covered by the Thar Desert.



### What?

- NGO funded, bottom-up scheme.
- Involves local people in decision making.

### Why is it needed?

- Water management in the region has been poor for many years.
- Less than 250mm rainfall per year.
- 95% of all rainfall comes in 4 months (June-Sept).
- Temperatures in the Thar desert can reach 53°C.



### Strategies?

#### Rain water harvesting:

**Taankas** - Underground storage collecting rainwater from roofs

**Johed** - Earth dams to capture rainwater

**Pats** - Irrigation channels that divert river water to fields

#### Education:

- Educating local communities on the importance of effective water management.

### Advantages

- ✓ Empowers local people
- ✓ Prevents further desertification
- ✓ Easy and affordable to maintain

### Disadvantages

- ✗ Climate Change may reduce rainfall further
- ✗ Coordination of locals is complex
- ✗ Cannot improve water quality

EG of local scheme to increase sustainable supplies of water

## Background Information

- The Netherlands is the 2<sup>nd</sup> largest agricultural exporter in the world.
- The Netherlands is roughly the size of Wales.
- Port of Rotterdam (largest in Europe) makes food exports cheap and easy.

## Why is Advanced Agriculture needed?

- Population growth and development leads to growing food demand in Europe.
- Climate change means temperatures and rainfall are becoming more challenging – so new crops that can grow in these conditions are developed – known as *Genetically Modified Organisms (GMOs)*.
- Traditional agriculture can be unreliable, affecting supply and prices of food.



Resources

## Advantages of Hydroponic Greenhouses

- Netherlands responsible for 75% of food exports leaving the EU.
- 10,000 hectares of greenhouses
  - Use 90% less water.
  - Produce 10x more food than fields.
- Wageningen University is the world leader in agricultural science.
- TNCs like Unilever and Nestle have their research divisions in the Netherlands.

## Disadvantages

- Set up costs are very high, pricing out smaller farmers.
- Reliant on GM crops which are expensive.
- Greenhouses need heating which releases CO<sub>2</sub>.

# EG of large-scale Agricultural Development

## Where?

- Senegal is located in West Africa
- They are located in the region.



## What?

- This is a bottom-up scheme using traditional farming techniques native to Senegal.

## Why is it needed?

- Senegal is in the Sahel region and faces desertification
- Less than 300mm rainfall per year in the North.
- 95% of all rainfall comes in 5 months (June-October).
- 1.3 million Senegalese face acute food insecurity.
- Climate change is making this worse.



## Strategies?

### Rain water harvesting:

**Half moon farms:** The curves act as rock bunds which trap water for the plants.

**Green walls:** Allow for shade so the soil doesn't become baked.

**Drip Irrigation** – Using drips of water instead of flooding fields to conserve water during the dry season.

## Advantages

- ✓ Empowers local people
- ✓ Prevents further desertification
- ✓ Easy and affordable to maintain
- ✓ Relies on local knowledge so less training is needed

## Disadvantages

- ✗ Climate Change may reduce rainfall further
- ✗ Shape of the bunds makes mechanisation very difficult
- ✗ Time consuming to construct and maintain.

EG of local scheme to increase sustainable supplies of water