IGCSE Geography

Case studies

Theme 1- Population

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A country which is over-populated : **Bangladesh**

Population - **153 million**
Population density- **1062/km²**
Land area - **147,000 km²**
Natural increase- **1.6%**

- Resource poor country
- Lack of natural resources
- In 1971, the population was 75 million, Now, it is more than the double of it : showing an increasing population growth rate.
- High poverty leads to a lower standard of living , increasing the need of children to earn to improve the economy.
- 4/5th of the population live in rural areas
- 40% of the population is under-employed
- Cyclones and flooding makes the situation worse, because **80%** are situated on the floodplains of Ganges, Brahamaputra and Meghna. People living there reach the higher grounds, increasing the crowd of the already crowded area. This increase rural-to-urban migration (one of the problems faced by Bangladesh due to overpopulation)
- The capital city Dhaka faces increased population as people move to Dhaka to fulfil their basic needs. As the population increases, Dhaka also faces pressure of housing, healthcare, water and sanitation.
- The population density of Dhaka - **43000/km²** ; one of the largest population densities in the world.
- Only **1 qualified doctor for 25,000** village people !
- Due to the increased population, problems faced by Dhaka include more traffic and congestion , and increasing unemployment. Moreover, getting admission became extremely difficult - **20 seats for 20,000 people.**
- Bangladesh's land area is relatively less than its population , making it a densely populated country.
- The population density is **20 times** the global average !
- A few more causes include fertile land for agriculture , a high illiteracy rate and no or little awareness of cons of a larger population.

Causes for a high growth rate-

- High birth rates
- High infant mortality rates- **43/1000** (IMR- Infant mortality is the death of young children under the age of 1. This death toll is measured by the infant mortality rate, which is the number of deaths of children under one year of age per 1000 live births.)
- Increased poverty so increase need of children for the development of the economy.
- High illiteracy rate - **73.91%**
- No awareness of contraception
- No emancipation of women
- Increased subsistence farming as **4/5th** live in rural areas.

Causes for high density-

- Land area is relatively less than the population
- A very fertile region - attracting farmers and others to live there
- Rural to urban migration in Dhaka
- Rice production.
- (you can include other causes too - mentioned above)

A country which is under-populated : **Australia**

Population - **22 million**
Population density- **3/km²**
Rate of natural change - **0.7%**
Infant mortality rate - **4/1000**
Land area- **7.7 million km² (6th largest in the world)**
Fertility rate- **1.8/woman**

- Resource rich country
- Exports raw materials like coal, iron ore, gold ,etc.
- Land area us huge, therefore, population density is quite less.
- There is an uneven population distribution -
    - Maximum people live on the fertile coastlines
    - Some parts of australis have 0 population
- There is a positive net migration, leading to a good quality life.

Causes of underpopulation

- There is developed infrastructure and improved health and education.
- Improved levels of healthcare
- Availability and affordability of contraception
- Low fertility rates
- Highly skilled workers are paid high wages , therefore , less need of children
- Emancipation of women

Problems -

- Shortage of workers
- Not possible to exploit all resources
- Less tax payers , therefore , the government receives less money
- Schools and hospitals may close
- Less brain power in the future ➤ Less innovation ➤ Less development of the economy
- Public transport links may close
- Dependancy ratio may increase

A country with a low rate of population growth (or population decline)

Russia

- In 2012, Russia's birth rate was 13/1000 while the country's death rate was 14/1000, giving a rate of natural change of -0.1 per cent. In 2017, Russia's birth rate was 11/1000 while the country's death rate was 13.5/1000, giving a rate of natural change of -0.25 per cent.
- Even as of now, in 2018, the growth rate is -0.02%.

Such natural decrease is common in eastern Europe. Russia's population reached its highest level of almost 148.7 million in 1991 (Figure 20 and Table 6), just before the break-up of the Soviet Union. Since then it has been mainly in decline, although very slight increases have been registered in some recent years. In 2012 the Russian population stood at 143 million. With a population density of about 8.4 km^2 according to the 2010 Russian Census, this is one of the most sparsely populated countries in the world.

Table 6 : Russia's population, 1991-2050

Year	Population (millions)
1991	148.7
2012	143.2
2017	143.98
2018	143.96
2025 (estimate)	140.8
2050 (estimate)	127.8

The decline in Russia's population has been due to a combination of economic and social factors. Population decline or very slow growth has been due to:

- Low birth rates
- High death rates, particular among men
- Emigration

The change in recent decades from a communist centrally planned economy to a market economy has resulted in some people being much better off, while many other people struggle to make aw reasonable living. Inequality has increased considerably in Russia, with unemployment and poverty being major concerns for many people. The cost of raising children is perceived to be high when both parents need to work to make ends meet. These circumstances have had a big impact on decisions to start a family on decisions to extend a family.

Education standards for women in Russia are high and thus women in general have the decisive say in decisions about family size. The use of contraception is high with 80 per cent of married women aged 15-49 using various methods of contraception. In 2015, adult literacy rate for Russian Federation was 99.7 %. Adult literacy rate of Russian Federation increased from 98 % in 1989 to 99.7 % in 2015 growing at an average annual rate of 0.59 %. This clearly suggests high female literacy also.

The difference in life expectancy between men and women in Russia is considerable. In 2012 life expectancy for women was 75 years, but only 63 for men. Even as per 2017, life expectancy for women was 77.64 years, but only 67.51 for men
This extremely low rate for men in a European country has been attributed to very high intakes of alcohol, the high incidence of smoking, pollution, poverty and the ravages of HIV/AIDS and other diseases. The high male death rate has resulted in there being 10.7 million more women than men in Russia.

Population decline has had its greatest impact in rural areas with 8500 villages said to have been abandoned since 2002. The cold northern regions of Russia have experienced the highest levels of depopulation. Such are the concerns of many Russians about the future that a sociological survey in June 2011 found that one-fifth of the Russian population are potential emigrants! In 2017, the net migration rate was 1.7 migrant(s)/1,000 population.

In 2008 Russia began honoring families with four or more children with a Parental Glory medal. The Government has urged Russians to have more children, sometimes suggestion that it is a matter of public duty. President Vladimir Putin on Tuesday announced a string of reforms aimed at boosting birth rates in Russia as the population continues its long-term decline following a period of improvement. The Russian leader said his government would allocate $2.4bn to the scheme, which would give Russian women an allowance of $180 for 18 months after the birth of their first child. According to the Russian statistics agency, the country lost 106,200 people between January and October 2017. During the same period in 2016, Russia gained 18 200 people. Vladimir Putin also called for extending an existing financial support program for families with a second child or more to the end of 2021. In its present form, the program is to expire in 2018.

For more than a century, Russia has suffered periodic waves of mass emigration. Now it could face yet another one, perhaps leading to the largest brain drain the country has experienced in 20 years. According to Russia's state statistical agency, 350,000 people emigrated from Russia in 2015 — 10 times more than five years ago. The outflow began in earnest in 2012, driven mostly by political friction in the country, but Russia's current economic crisis has accelerated the pace. As highly skilled Russians emigrate, the future of innovation and private business in the country has been called into question. Since 2012, the number of Russians leaving the country has steadily climbed, from 36,774 in 2011 to some 350,000 in 2015.

An International migration : **From Mexico to USA**

- Since 1965 more than **16 millions Mexicans** have migrated to USA.
- Till now, **6,650,000 illegal** immigrants have passed the 2000 km border between USA and Mexico, and more than 6000 people have died trying to pass the border illegally.
- Each year , 1 million Mexicans migrate to USA.

➢ Reasons for migration

1. **Push factors of Mexico** (that encourage people to leave its home):

- High crime rates- past 5 years, **47,500** people have been killed due to crimes (drugs)
- Poor medical facilities - **1800 per doctor**
- Low paid jobs- **GNP-$3750**
- Poor literacy rate- **55%**
- Climate and natural disasters
- Corruption in the government
- Unemployment and poverty(40%people are unemployed)
- Despite being the 11th richest country, it also has the 10th highest poverty- **poverty rate: 44.2%**

2. **Pull factors of USA** (factors that attract people):

- Quality of life is better and improved infrastructure
- Lower risk from natural disasters
- Excellent medical facilities- **400 per doctor**
- Well paid jobs- **GNP-24,750**
- Literacy rate- **99%**
- Lower crime rates and better policing
- School leaving age is 16 vs 14 in Mexico

➢ Impact on Mexico:

- Shortage of economically active people
- Food shortages
- Increased dependant population as youth migrated
- Legal and illegal immigrants send around **$6 billion a year** to Mexico
- Gender inequality-hard for women to find partners for marriage as most men migrated to USA. This decreased birth rates, further increased the dependency ratio.
- As people migrate, pressure on land, social services and jobs are relieved

➢ Impact on United States of America:

- Illegal migration costs USA millions of dollars on border patrol and prison.
- Improved culture and its aspects in a few states
- As tons of drugs travel across the border, problems of drug related crimes are created, increasing crime rates.
- Spanish is taught in almost all American states
- In 2015, the top 5 states for Mexican immigrants were **California - 37% of all Mexican immigrants , Texas- 22% , Illinois - 6% , and Florida- 2%.**

A country with a high dependent population : **Japan**

- Japan is a MEDC(more economically developed country).with a population of **128 million-** 10th largest in the world
- It has the largest population of over 65 years in the world (1/5th of the population is over 65, which is 19.7% or 25.2 million Japanese)
- This is higher than other countries , such as Italy (19.6%), Germany(18.6%) and France (16.3%)
  - Total fertility rate - **1.25**
  - Average life expectancy- **84**

➢ **2 main causes of a high dependant population in Japan:**

1. High life expectancy- people are living longer due to improved medical care, advancements in technology , a healthy lifestyle and good sanitation. For **males-82** and for **females- 89**
2. **Low fertility rates -1.25** , this is due to later and fewer marriages , higher education, emancipation of women and higher cost of raising a child.The percentage of women never married increased from **22%to 30%**

➢ **Other causes:**

- Declined Infant mortality rate
- Lack of child care facilities
- Pregnancy is expensive in Japan
- Child benefit paid by the government to families is low

➢ **Impacts of Japan's Ageing population:**

- The Government raised the retirement age from 60 to 65
- Lack of healthcare staff to look after the elderly
- Costly pensions
- Workforce is expected to fall 15% over the next 20 years and halve in the next 50 years
- Shrinking rate of workforce - 1%per year
- Increases in the dependency ratio(old)
- Old people are not as innovative, therefore , a less educated workforce and lower development of the economy
- Requirement of high tax rates to gain tax revenue for the economy.
- Requirement of immigration of economically active people to reduce the ageing population and to increase economic growth.

A sparsely populated country or area : **The Canadian northlands**

Location:

- The Canadian Northlands are an area of North America that lie beyond 55 degrees north.
- The largest settlement in the Canadian Northlands is Yellowknife in the Northwest Territories, population 19,000
- The area has a population density of less than 1 person per square km .

Reasons why the area is sparsely populated:

- A major reason why so few people live in this area is due to the climate.
- Temperatures are extremely cold and inhospitable in winter, with the mean average January temperature being -20 degrees C.
- Summers are short and the climate in much of the northlands is beyond the limits of agriculture.
- The inability to grow food on the land is a key factor in explaining low population density. 5
- Much of the Northlands are affected by permafrost. This means that the ground is permanently frozen for long periods of the year. When the ice does melt in some the land becomes waterlogged. This makes life in the region very difficult e.g. it makes it restricts building and crop growth.
- The environmental conditions mean that there are great difficulties for human development in the region.
- For example, transport and communications are hampered by the climatic conditions.
- Railway and road routes are extremely limited and the use of water transport is dictated by the seasons.
- For many communities, air transport is the only link they have to the outside world.

Anti-natalist policy : **China's one child policy**

- Population- 1.3 billion (acc to 2016)
- Life expectancy- 76 years
- Fertility rate was 5.7 births/woman in 1970, however in 2015 it reduced to 1.57 births/ woman. Since 1970 , birth rates have reduced by 400 million.
- After the world War 2, China needed a higher population to strengthen its army; this resulted in population growth of 55 million people every 3 years. This was too much and so China was forced to introduce a one child policy in 1979.

➡ **There were other causes:**

- In the early 1970s, the government realised the country was headed for famine unless severe changes were made quickly.
- Couples were encouraged to have large families to repopulate the country. A "baby boom" followed and the population was growing unsustainably fast. Also, the increasing population meant that there were limited resources which meant that there were many poor people who could not afford to pay taxes , and the government needed more money to create facilities for the large population.

➡ **What all was done to work this policy:**

a) Restrict family size from 3 children to 1 child
b) increase n marriageable age for men-22 and women-20
c) citizens had to apply to the government to marry
d) If you apply by the rules-your family gets free education, healthcare, housing and a job.
e) if you don't apply by the rules, then no benefits, one gets fined and abortion is required.
f) Would receive a 5-10%salary rise for limiting their family to one child.

- In 2007, 39% of the population was subject to a strict one-child restriction.

➡ **Effects of the policy:**

a) Female infanticide (killing of girls because couples favoured males)
b) Birth rates fallen from 44 to 12
c) The population growth rate has decreased by more than 10%since the policy was introduced.
d) It's estimated that 400 million fewer people have been born.
e) New industries have lifted millions out of poverty
f) Dependency ratio increased decreased.
g) Working age decreased (long term)
h) 'Little Emperor' syndrome : only children were often spoiled.
i) Gender imbalance: more than 30 million young men than young women.

➡ **Exceptions to this policy:**

a) If first child was disabled (mentally/physically), 2nd child was allowed.
b) If you have twins or triplets
c) Families who lived in rural areas were allowed a 2nd child.
d) Ethnic groups were exempt because they could have become unsustainable under the One Child Policy.
e) Couples who bribed.

Pro-natalist policy : **France**

- Population- **67 million** (2015)
- Fertility level was **1.67** (children per woman) in 1992 and in 2015, it was 2.0, this is close to the replacement rate (2.1)
- When France had a low population or low fertility levels, it got concerned about-

a. Decrease in supply of labour-
b. Long term prospect of population decline

- Fertility levels had reduced because of various reasons:

a. Education
b. Women in careers
c. Later marriages
d. State benefits

- The government passed a **"code de la famille" in 1939** which:

➡ offered financial incentives to mothers who looked after their children at home
➡ banned contraceptives
➡ subsidised holidays
➡ longer maternity leave
➡ higher child benefit
➡ improved tax allowance on large families
➡ **30%** reduction on public transport for 3 children families
➡ Child oriented policies
➡ A cash incentive of **£675 monthly** (nearly the minimum wage) for a mother to stay off work for one year following the birth of her third child

- **Impact-**

a. Due to all the cash payments, tax breaks and subsidised child care, France now has the 2nd highest fertility rate in Europe.
b. In 2007, France celebrated the biggest baby boom since the 1960's.
c. Size of the workforce increased
d. More money had to be spent on healthcare
e. People had less disposable income as the young-age index was so high.
f. By 2007,France had 12.91 births/1000 population, 1.98 children born/woman, 1.52 migrants/1000 population and a population growth rate of 0.588%.

An earthquake : **Christchurch 2010-12**

- Christchurch is New Zealand's second largest urban area.
- Population= **38600**
- The 2010 earthquake, also known as the Canterbury or Darfield earthquake, struck the south island of Christchurch on 4 September, at 4:35 am.
- It had a magnitude of **7.1** and an epicentre of **40km west of Christchurch** (depth-10km)
- New Zealand lies at an interface of pacific plate and indo-Australian plate.
- This earthquake had occurred on a destructive plate boundary, when the pacific plate was sub-ducted under the indo-Australian plate.
- Impacts:

➔ As it had occurred at early hours, mostly, people were asleep, causing greater damage.
➔ Sewers were damaged
➔ Water lines broke
➔ Power of up to 75% of the city was disrupted
➔ The Airport was closed and all flights were cancelled

- Over 40 rescue teams and 3 sniffer dogs were brought from the North Island.
- By august 2012, over 11000 aftershocks of magnitude 2.0 or more, including 26 over 5.0 and 2 over 6.0 were recorded.
- The 2011 earthquake was the strongest aftershock, which had occurred on 22 February, at 12:51 pm.
- It had a **6.3 magnitude and an epicentre 10 km south east of Christchurch** (depth-5km)
- It had occurred on a conservative plate boundary.

Impacts:

➔ 185 people were killed
➔ 115 killed in the Canterbury television building which had collapsed and caught fire
➔ Others were killed due to the collapse of the PG-house and when the masonry fell on a bus.
➔ Liquefaction affected the eastern suburbs (400000 tonnes of silt)
➔ The total cost of rebuilding had estimated to $33 billion.
➔ Up to 80% of the water and sewerage systems were severely damaged.

- Over 2000 portaloos and 5000 chemical toilets were brought and a full emergency management programme was in place within 2 hours of the earthquake.
- Despite the earthquake being smaller in magnitude, the 2011 earthquake was more damaging than the 2011 earthquake because:

I. The epicentre was closer to Christchurch
II. It was shallower at 5km than 10km underground
III. It had occurred during lunchtime on a weekday when the CBD was quite busy
IV. Buildings were already weak from previous earthquakes.
V. Liquefaction was greater

A volcano : **Soufriere hills, Montserrat**

- It is a small island in the Caribbean
- Montserrat lies on a destructive plate boundary where the North and South American plates are sliding beneath the Caribbean Plate (subduction zone).
- Until 1995, It was very much an 'island paradise' (and some parts still are) with an economy based on farming, fishing and tourism.
- In July 1995, Soufriere Hills erupted for the first time in 350 years
- The volcano was largely dormant since 100 years before the major eruption of 1995-1997.
- The rising magma caused the volcano, forming a chain of volcanic islands.
- The deadliest eruption happened in June 1997 when explosive eruptions killed 23 people. Only 39km2 was considered safe
- One month later, 50% of the island was evacuated to the north of the island away from the danger zone. In April 1996, Plymouth became a ghost town as more people were evacuated.
- Due to the erupting volcano, mudflows and lava flows were caused. The dome collapsed leading to rocks and ash being thrown out and a new dome was created.
- As south (the hills) was the main agricultural part of the island (where the volcano erupted), people suffered a great loss.
- The largest settlement, Plymouth, with 4000 people, had to be abandoned.

➔ This was a major problem because it was the centre of all government offices, shops and services, markets, post offices and cinema theatres.
➔ The southern island had to be evacuated.

- 23 deaths and over 100 injured, Plymouth (capital) covered in ash, and High % of homes, businesses and important infrastructure destroyed, Main airport and port closed, 75% of the island was covered in ash.
- Montserrat's population fell from 11000 to 4500.
- The northern island was redeveloped with new homes, hospitals, schools, roads, a football pitch, a renovated theatre etc. Here, population increased to 9000.
- Even in the northern parts, population fell to 5000 due to relative lack of jobs and development of airstrips. The government had stopped subsidizing ferries causing reduced visitors as transportation became expensive.
- Housing shortages leading to a 70% increase in rents
- Islanders were offered £2,500 each to relocate to live permanently in the UK.
- UK sent £41m in relief aid and a further £75m to assist long term development.
- The island is promoting 'volcano tours' in an effort to attract tourists back to Montserrat. However, only 20- seater planes are allowed to land at the new airport so this is proving difficult.

The opportunities presented by a river or rivers, the associated hazards and their management: **River Ganga**

- River Ganga passes through India and Bangladesh, it is 2525km long and 17 m deep (average). The maximum depth is 33m
- It originated from the Gangotri glacier in Uttarakhand.

- **The opportunities it provides:**
- Fertile Land- annual deposits of alluvial from flooding
- Agriculture of rice and jute- 6th largest producer of ice and 2nd largest producer of jute.
- Irrigation when the climate is unsuitable
- Water supply for cleaning , bathing, drinking and irrigating - enough for the dense population of 1101/km²
- Fish supply for trade and food- all provides jobs for people to reducing unemployment and boosting the economy
- Flat land- high population density can be supported

- **Hazards-**
- Regular pollution
- 3 billion lives of sewage is released into Ganges
- Human waste in the waters is more than 100 times the Indian Government's official limit.
- Flooding-

✓ Human causes of flooding :

1. Deforestation - reduces interception and increases surface run off , causing floods.
2. High population density means more people living on the floodplains, therefore causing more deforestation to build shelter.
3. Poorly maintained flood defences
4. Lack of weather warnings because of poor communication links.
5. Creation of dams- When the water behind a dam reaches the capacity of the dam, water must be released the prevent damage to the dam. Sometimes extremely large amounts of water needs to be released during large rain events. These large releases of water can sometimes cause flooding downstream.
6. Urbanisation - decreases infiltration causing increased surface run off.

✓ Physical causes of flooding :

1. The south of India is one big floodplain (low lying area)
2. 70% of Bangladesh lives on land that is less than 1m above sea level.
3. Global warming- snow melts in the Himalayas causing sea levels to rise and causing floods
4. Cyclones hit Bangladesh from the Bay of Bengal causing storm surges
5. 10% of Bangladesh is covered in rivers/lakes
6. 1.08 km² of drainage basin is a large area that is affected by rainfall, causing flooding.

- **Impacts**
- 57% of Bangladesh's land is flooded
- 1300 people were killed
- 7m homes were destroyed
- Diseases like Typhoid were spread
- Shortage of clean water
- 2m tonnes of rice was lost

- Roads were damaged
- $1 billion was the total damage cost
- 670,000 hectors of crops got destroyed

- **Management**
- The government of Bangladesh began to work with different agencies to produce the National Flood action plan (FAP)

✓ Short term management :
- Boats were used to rescue people.
- Emergency water and food supplies were distributed
- Foreign aid was accepted
- Tents and blankets were provided or the homeless
- Basic repairs were made to houses

✓ Long term management :
- Reduced rate of deforestation in the Himalayas
- 7 Dams were built- costing $40 million , one of them was the Tehri Dam
- 5000 flood shelters were built
- 350 km of levees were built
- Flood warning systems were developed

Extra information on the opportunities :

- The opportunities it provides:
  - As India's holiest river, the Ganga has a cultural and spiritual significance that far transcends the basin's boundaries. It is worshipped as a living goddess and, since time immemorial, people from across the country have flocked to the many historic temple towns the lie along the river's banks to pray and bathe in its flowing waters.
  - There are some 30 cities, 70 towns, and thousands of villages along the banks of the Ganga. Nearly all of the sewage from these population centers – over 1.3 billion litres per day – passes directly into the river, along with thousands of animal carcasses, mainly cattle.
  - The densely populated Ganga basin is inhabited by 37 per cent of India's population.
  - The entire Ganga basin system effectively drains eight states of India.
  - About 47 per cent of the total irrigated area in India is located in the Ganga basin alone.
  - It has been a major source of navigation and communication since ancient times.
  - The Indo-Gangetic plain has witnessed the blossoming of India's great creative talent.
  - In the lower Ganges valley, the intensive subsidence rice cultivation is dominant. This area is suitable for rice cultivation due to it having 21 degrees Celsius or more temperature throughout the year and receiving over 2000mm of monsoon rainfall. This creates employment i.e. job opportunities in the area- farmers can cultivate rice in the fertile soil and the flooded areas of the lowlands and earn a living.
  - The river provides a great supply of water for e.g. the International Rice Research Institute estimated it takes about 5000 liters of water to produce 1 kg of rice.
  - This labor intensive farming is also facilitated by the river providing water for irrigation purposes (paddy fields). It's a perennial source of irritation to a large area where crops such as lentils, sugarcane, potatoes and oil seeds can be cultivated- this is facilitated by presence of minerals like iolite, smectite, chlorite and kaolinite in the area.
  - It's a source of electricity.

- Tourism- Ganga becomes a source of adventure in places like Rishikesh. The fast flowing emerald water helps adventure buffs to enjoy activities like river rafting, kayaking and body surfing.
- Water supply for washing, bathing etc. e.g. Varanasi.
- Home to indigenous and migratory birds and endangered animals: The Ganges river basin contains high biodiversity. There are over 140 fish species, the richest freshwater fish fauna in India, 90 amphibian species, and 5 areas supporting birds found nowhere else in the world, endangered Ganges River Dolphin, rare freshwater shark, Glyphis gangeticus.

Note- as a 7 marker (the case study question), you can get a question based on the causes/impacts of flooding too.

The opportunities presented by an area or areas of coastline, the associated hazards and their management : **Holderness Coast , Uk**

- The holderness coast is in the north east of England
- The coast runs from the Flamborough Head (north) to the Spurn Head (south) which is a spit
- Its a 61 km stretch of coast
- It erodes at 2m/year (one of the fastest eroding in the world)

➡ **Reasons for eroding**
- Years ago, the north of England was covered in ice, as ice melted , it deposited huge amounts of glacial deposits , also known as boulder clay (this was weak and vulnerable to erosion)
- Strong prevailing winds causes longshore drift and therefore moves material south along the coastline

➡ **Opportunities :**
- Flamborough head - stunning scenery. Due to high levels of tourism , it generates high income.
- Bridlington- provides retirement homes with sea side views.
- Hull- every year, 13 million tonnes of imported cargo passes thorough the port which employs 5000 people. The Fishing industry lands fish at hull docks.
- The holderness country park- provides tourists with a large fishing lake and a dog walking area. Guests can stay in either log cabins or Caravans.
- Easington gas terminal - provides 1000 jobs and 25% of Uk's gas supply.
- Humber Estuary- Offshore and Onshore wind turbines use strong winds to generate renewable electricity.

➡ **Hazards:**
- Global Warming
- Pollution from sewage discharge
- Litter thrown can kill animals
- Overfishing
- Erosion
- If there is a high frequency of storms , then increased chance of floods.
- Tropical storms and hurricanes, storm surges and Tsunamis are likely to occur.

➡ **Management :**
- Hornsea -> this is the main settlement with a population of 8500, it generates large income through tourism and therefore needs protection.
  It is protected by:
- a 3m high sea wall, which absorbs/reflects wave energy
- Groynes , which prevent longshore drift (preventing erosion)
- A concrete promenade

- Maple town -> this is a small town consisting of houses, a church, parks, etc.
- Initially, it didn't receive any protection , and therefore a lot of protests happened.

- As maple town was in the south , It didn’t receive any sediment due to the longshore drift prevention in the north, (and longshore drift happens from the north to the south), disabling the creation of a beach.
- It eventually received protection by creating 2 rock groynes to prevent longshore drift so that sediment accumulates , rip rap, and the cliff was regarded too.

- Withernsea -> is protected by a sea wall, rip rap, and gryones
- One of the places protected is Easington in UK.

An area of tropical rainforest : **Amazon Rainforest**

- 1/3rd of the world's trees grow here
- Home to 20 million people who are involved in farming
- Home to a 1000 species of birds
- Home to 60,000 species of plants
- Land area- 5.5 million km²
- It provides 20% of world's oxygen
- Since 1970, 91% of land has been deforested

Causes of deforestation

- Cattle ranching is why 70% of deforestation occurred
- Increasing population -> requires more land -> more jobs and mo industries -> therefore higher deforestation
- Slash and burn farming
- Subsistence farming (many farmers do it for a living)
- Road building- 12,000 km of new roads have been built
- Logging- timber, as it is a source of income
- Hydroelectricity to be built
- Mining of minerals
- Transportation of timber, minerals ,etc required more roads
- The trans-amazonian highway was built (5300 km long)

Impacts :

- Habitats of many species are destroyed (loss of biodiversity)
- Deforestation -> no canopy to protect soil from heavy rain -> soil erosion ->infertility -> farms and cattle ranches are abandoned
- Less trees -> less evaporation -> less water vapour -> less rainfall -> likely to cause local droughts.
- Burning of the forest (slash and burn farming) -> global warming due to the release of carbon dioxide which is a greenhouse gas.

Vegetation -

- Because of various conditions the vegetation has adapted itself to live in the rainforest. The trees usually have a smooth bark to not let other plants like strangler figs grow on them. Strangler figs grow on trees and over time kill the host tree and take its place. Plants have adapted by growing drip tips in their leaves. Drip trips allows excess rainwater to easily fall from the plant. Plants need to shed water to avoid growth of fungus and bacteria in the warm, wet tropical rainforest. Some plants also have fan shaped leaves to capture sunlight as there is very less sunlight found in the lower areas of the rainforest. Tall trees grow buttress roots which go deeper than normal and provide trees with extra stability.
- There are approximately 400 billion trees growing in the rainforest which belong to 16,000 different species. There are a mere 227 species make up half of the total trees across the whole basin. These 'hyper dominant' species include the rubber tree, the walking palm and the ungurahui tree – whose oil can be extracted to make juices and ice cream. Pona is a tree common in the west and it grows hard fruit. Palmito is the most common tree in the rainforest, there are 5.2 billion palmitos. There are 1000s of other species of trees that grow in the rainforest.

Climate :

- Hot and humid
- Annual temperature - 28 degree Celsius
- Annual range of temperature - 2 degree Celsius
- Difference between day and night is greater than the difference between seasons
- Convectional rainfall
- Rainy months (main) are from December to march

An area of hot desert : **Sonoran Desert**

- The Sonoran Desert is a North American desert which covers large parts of the South-western United States in Arizona and California and of North-western Mexico in Sonora, Baja California, and Baja California Sur. It is the hottest desert in Mexico. It has an area of 260,000 square kilometres (100,000 sq. mi). The western portion of the United States–Mexico border passes through the Sonoran Desert.

- The summer air temperatures routinely exceed 40°C (104°F), and often reach 48°C (118°F). These high near-surface temperatures interact with cool, moist air in the atmosphere to produce the violent thunderstorms of the summer monsoons. As moisture on the soil surface and near-surface air evaporate following a storm, temperatures may drop 10°C (50°F) or more, often within a matter of minutes. Winter temperatures are mild, with valley bottoms typically free of frost, while the surrounding mountains may have dense snow cover at high elevations and north and east aspects. During any season, diurnal swings of 15°C (59°F) or more are common, as the dry atmosphere and relatively low vegetation cover facilitate re-radiation of daytime heat into the atmosphere overnight. Annual precipitation in the Sonoran Desert averages from 76 to 500 mm (3–20 in) depending on location, with substantial inter- and intra-annual variability in timing and quantity. Precipitation is typically much higher with elevation due to the orographic effects of the sky islands, with a sizable proportion occurring as snowfall.

- The Sonoran Desert supports many types of soils that promote or hinder plant growth depending on location. In places that lack flowing or ground water, soils have a lower organic matter content. In contrast, soils in the Gila and Salt River valleys sustain rich vegetation and agriculture. In the desert basins, soils may be gravelly, sandy, or made up of clays, which can be gray and poor in humus or reddish and rich in lime. In central Arizona, brownish clays and sandy loams mask granite rocks. Within granite rocks and soils a unique mineral deposit called caliche can be found.

- The Sonoran Desert has two rainy seasons, or bimodal rainfall. Bimodal rainfall allows for the growth of two dominant forms of plants that distinguish the Sonoran Desert from the other North American deserts: legume trees and columnar cacti. The biologically rich Sonoran Desert region supports many species of plants. Species native to desert regions have special adaptations that let them deal with low water availability. Plants use water sparingly and conserve water for periods of drought. For example, cacti have leaves or stems that are very thick and fleshy, and can hold a lot of water while losing very little through evaporation. Small hairs help shield the leaves and stems of some plants from high temperatures by deflecting sunlight from the plant surface. Some plants have succulent stems that allow them to store more water for a longer period. Other plants are draught tolerant which refers to a plant's ability to withstand desiccation without dying.

- The Sonoran Desert is home to a huge number of animal species. The desert supports over five hundred species of vertebrates and innumerable invertebrates. The area around Tucson, Arizona is home to over one thousand species of bees alone! The Sonoran Desert is a complex ecosystem that is at times hot, dry, and dangerous for its native animals and yet it is still home to many wildlife species. Animal adaptations help them obtain food, build homes, withstand weather and attract mates. For example, kangaroo rats (Dipodomys spp.) have no need to drink water because they can obtain

their water from seeds and vegetation that they ingest. Other animals have physical adaptations as well. The jackrabbit has very large ears with many blood vessels that help to release body heat. Many animals are nocturnal, restricting all their activities to the cooler temperatures of the night. Bats, many snakes, most rodents, and some larger mammals like foxes and skunks, are nocturnal, sleeping in a cool den, cave, or burrow by day. The Gila woodpecker has developed a way of burrowing into large saguaro cacti to make a home while also not harming or killing the cactus. These adaptations come from actions that the animals take, and are known as behavioural adaptations.

- Droughts have hindered the vegetation and animals in the sonran forever. The recent draughts, at the beginning of the 21st Century, contributed to massive die-offs for many plant species. In the northwestern Sonoran Desert, the drought contributed to extreme desiccation and mortality of cholla (Cylindropuntia) cacti. At low elevations (210–290 m), over half of the Cylindropuntia bigelovii, over 17% of the C. echinocarpa, 6% of the C. ramosissima, and less than 2% of the C. ganderi were dead by winter 2004/2005. At a higher elevation (~820 m), 26% of C. bigelovii and 14% of C. ganderi were dead by winter 2005/2006. The lower mortality for C. bigelovii at the higher elevation site was likely due to milder temperatures and greater precipitation; the greater mortality for C. ganderi at the same site may be the result of freezing or frost damage to tissues during the drought. Differences in mortality among species at both elevations were attributed to several factors, including: intra- and interspecific competition, reproductive strategy, and shoot architecture. Based on this study and previous research, it is believed that C. bigelovii experiences periodic extensive die-offs in response to extreme droughts, whereas populations of the other three species apparently change little during such droughts.

A transnational corporation and its global links : **Walmart**

- operates discount department and warehouse stores
- total $500 bn revenue and $20 bn profit
- employs 2 million people in 11,000 different outlets in 28 countries
- operates under different names e.g ASDA in the UK and Seiyu in Japan
- worlds biggest retailer
- 130 million shop each week

Global links :

- It was set up in Arkansas, with rapid growth in the USA and was first abroad in Mexico
- expanded to China, Canada, Hong Kong, Japan and Britain in the 90's
- It has 500 ASDA stores in the UK, employing 175,000 people
- African countries for cheap production
- China is its largest producer, shipping $18 billion to the USA in 2011
- finds its cheapest labour in Bangladesh

Positive effects

- Lots of new jobs e.g three new stores opened in Argentina, creating 450 new jobs
- Invests in sustainable development e.g 20 stores have solar panels in Puerto Rico
- Wal-Mart donates millions to improve health in countries it is based in. e.g. in 2008 in Argentina they donated $80,000 to local projects and help feed 12000 people
- Local companies supply to Walmart, creating $10 bn a year in Canada

Negative effects

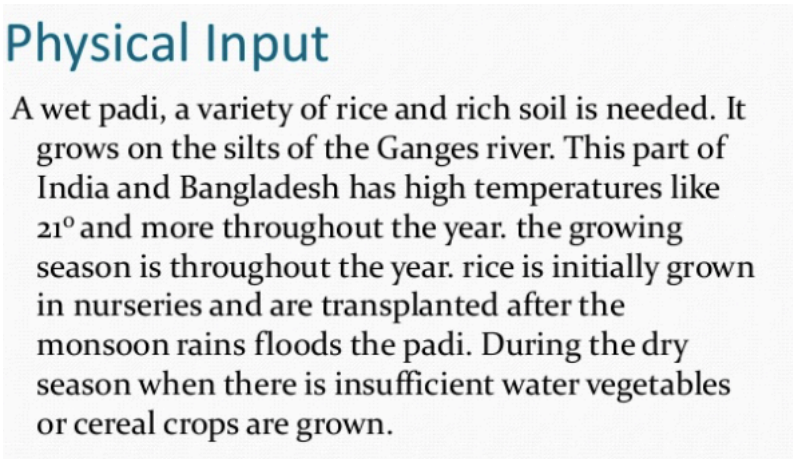
- Causes smaller shops to go out of business
- Not all wages are the same e.g $6/hr in the USA but only $1/hr in China
- Some suppler companies work long hours e.g 80 hours a week in Bangladesh - 20 over
- The stores take up a lot of land e.g in Hawaii 2100m2

A farm or agricultural system : **Intensive rice production in the Lower Ganges Valley**

The Lower Ganges valley is in Bangladesh , India.
There, Rice is 75% of their diet.

Physical Inputs -

- The temperature is over 21° throughout the year, there are 2 crop seasons (rice needs a season of around 100 days)
- 2000mm of rainfall is sufficient for wet rice cultivation.
- Through regular flooding, rich alluvial soil is built up.
- 90% of agriculture water is used for rice production -> Water intensive
- 5000 litres of water is used to make 1 kg of rice.

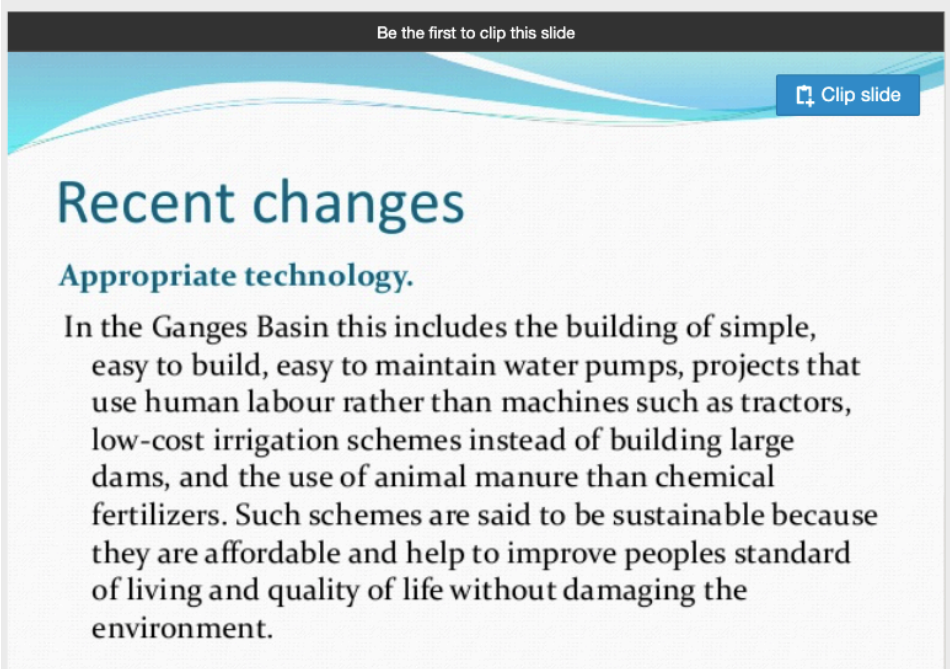


Human inputs -

- As it is grown on a small plots of land (intensive farming), a lot of labour I used -> therefore being labour intensive.
- Manual effort is needed to prepare fields, plant, weed, irrigate snd harvest and :
- Build embankments that surround the field
- Construct irrigation canals

Processes - Planting rice in nurseries , ploughing and transplanting rice into padi field, harvesting rice.

Outputs- high yields/hectare of rice.



A country or region suffering from food shortages : **Sudan**

- A thriving agriculture sector is crucial to long-term peace and development in South Sudan. Up to 90 percent of the country's population depends on farming, fishing or herding to meet their food and income needs. Yet, South Sudan faces one of the world's worst humanitarian and food security situations.
- Famine was declared in February 2017, and just months later contained thanks to massive humanitarian support. However, food insecurity remains at extremely high levels. Half of South Sudan's population is now severely food insecure according to the latest Integrated Food Security Phase Classification (IPC), which estimates 6 million people were experiencing crisis or emergency levels of food insecurity from June to July 2017. Of particular concern are the 45 000 people who are experiencing a Catastrophe, which could to deteriorate to famine without immediate humanitarian access and assistance. The outlook for the remainder of 2017 is dire.
- More than 3.8 million South Sudanese have been displaced since mid-December 2013, including over 1 950 000 people who are sheltering in neighbouring countries. Continued violence, a deteriorating economy and climatic shocks indicate the deepening impact of the crisis and hindering agricultural activities, affecting production and disrupting livelihoods.

Seriousness of food shortage in Sudan:

- 3.9 million people – nearly one in every three people in South Sudan – were severely food insecure and 3.6 million were considered to be 'stressed', in September 2015. An estimated 30,000 people were facing catastrophic food insecurity (IPC Level 5) in Unity State, leading to starvation, death, and destitution. (OCHA, 5 Jan 2016) At the height of the lean season in July 2016, some 4.8 million people – more than one in every three people in South Sudan – were estimated to be severely food insecure. In September 2017, 6 million people were in Crisis (IPC Phase 3), Emergency (IPC Phase 4) and Catastrophe (IPC Phase 5), which corresponded to 56% of the total population.

- WFP resumed the integrated rapid response mechanism (IRRM) and currently has seven teams deployed in Bilkey, Nyandit, Kurwai, Jaibor, Chuil, Buot and Ulang, providing life-saving food and nutrition assistance to around 96,633 people, including 17,370 children under the age of five. WFP plans to deploy an additional 26 missions in the coming six weeks, targeting close to 400,000.

- An estimated 5.3 million people, 48 percent of the population, are currently facing Crisis (IPC Phase 3) or worse acute food insecurity, despite the harvest and continued large-scale assistance.

- Extreme food insecurity persists across South Sudan as the lean season progresses, conflict continues to disrupt normal livelihoods, and macroeconomic conditions remain very poor. Of greatest concern in April are Pibor of Jonglei and Kapoeta East of Eastern Equatoria. However, southern and central Unity, northern Jonglei, and Wau County also remain of high concern, and Crisis (IPC Phase 3) or Emergency (IPC Phase 4) acute food insecurity exists in all regions of the country despite ongoing humanitarian assistance.

- More than 70,000 died from hunger and diseases during the civil war

- In April 2014, the U.N. Food and Agricultural Organization (FAO) found that 3.3 million people faced stressed or crisis levels of food insecurity and that IDPs comprised about 80 percent of this food-insecure population. Further, the FAO raised concerns of a worsening humanitarian crisis, fearing that this emergency is "largely slipping from the radar of the international community." The U.N. World Food Program (WFP) estimated that 4.5 million Sudanese face food insecurity due to conflict, lack of access to land or livelihoods, and rising fuel and food prices. Accordingly, WFP characterizes Sudan as one of the world's "most complex humanitarian emergencies."

- A February 2016 U.N. Humanitarian Bulletin provides a bleak outlook, finding that 242 people, including 24 children, died from a lack of food and hunger-related illnesses in the last six months of 2015.

Some general causes:

- Sudan is one of the most seriously affected countries by desertification in Africa. The arid and semiarid lands cover an area of 1.78 million km2 which represent about 72% of the total area of the country

- Hunger and food insecurity have been far too common in Sudan. As severe drought and famine swept through East Africa in the 1980s, the Sudanese acutely felt the effects of these deprivations. Darfur, in particular, was one of the most drought-affected regions. About 20 years later, at least 180,000 Sudanese died from hunger and related disease during the Darfur genocide in 2003 and 2004. Many that survived the conflict still live in IDP camps, where daily life is incredibly difficult, especially for vulnerable groups such as women and children, who sometimes go the entire day without eating.

- The worst drought in sixty years is again pushing East Africa towards crisis, as millions of people desperately need food. In Ethiopia, 10.2 million people have a critical need for food aid, while in South Sudan 2.8 million people face crisis-level food insecurity.

- Conflict, lack of access to land or livelihoods, and rising fuel and food prices

- Displacement fueled by the recent military campaign in Jebel Marra has contributed to increased food insecurity in South Darfur away from the conflict, while the government's economic policies have caused food shortages across Sudan that have had a disproportionately negative impact on the poor, including young children and students. Although the causes of food insecurity and hunger are often complex, within Sudan, government policies drive these outcomes. The regime's actions both directly cause hunger and suffering, such as through the denial of humanitarian assistance to civilians living in South Kordofan and Blue Nile, and indirectly contribute to food insecurity through misguided economic policies and a refusal to invest in the country's healthcare or infrastructure.

- The Bashir regime knows only personal enrichment and violence, relying on corruption, repression, and force to remain in power. Punishing civilians in the areas where armed opposition dared to resist this kleptocratic regime has long been a key element of its repressive strategy. Food insecurity and hunger is just a continuation of this strategy, as is stifling the efforts of journalists to expose official corruption and government wrongdoing.

physical factors - how drought and soil degradation have contributed to food shortages

•long-term decline of rainfall- Khartoum has a three-month rainy season (July-September) with an annual average rainfall of 161 millimeters (6.3 in).

•increased use of marginal land leading to degradation: Most of the remaining semi-arid and low rainfall savannah, representing approximately 25% of **Sudan** s agricultural land, is at considerable risk of further desertification

•drought is the main reason as it lies 15 degrees North of the equator

•difficult to reach - too boggy

•pests and bad weather failed crops: Delayed and poor rainfall in a number of Sudanese localities during this year's rainy season led to a significant decrease of yields in the November-January harvest period, the UN Food and Agriculture Organization (FAO) reported, as per 2015. According to a FAO survey (2015) , the 25-80 percent reduction in rainfall coupled with a delayed planting period led to a 30-50 percent crop loss.

•diseased water - cholera and typhoid contracted

•prolonged drought means poor ground, with inflation of food prices: Depreciation of the South Sudanese pound has also caused a hike in food prices. Inflation is spiraling out of control at 125%, eroding both the purchasing power and the food security of households reliant on markets.

•social factors - poor health and population growth

•high population growth – 2.4% growth rate in 2016 and increasing growth per year worsens marginal land

•high population leads to overgrazing and land erosion: - In Sudan about 5 x 105 km2 are directly affected by desertification, where more than half the population of the Sudan live in this area.- - In Kordofan the livestock population increased nearly fourfold from 1957 to 1966 and it is likely having been increased ever since. This rapid increase in the number livestock has off-set equilibrium that once existed between livestock and the natural grazing resources. This leads to direct removal of vegetation cover with a consequent reduction in human and livestock carrying capacity of the land and eventually desertification.

•high IMR due to AIDS threat 53 deaths per 1000

•illiteracy- Literacy rate, adult female (% of females ages 15 and above) in Sudan was reported at 53.12 % in 2015, according to the World Bank. South Sudan has one of the highest rates of illiteracy in the world, according to the United Nation Educational, Scientific and Cultural

Organization, UNESCO. UNESCO country representative Shadar Umar said the number of illiterate people aged above 15 years is more than 70 percent of the population.

•political / economic factors

- •has to import from Uganda - double the price
- •high military spending $1bn
- •limited access to buy food or infrastructure to distribute it due to the 50 year civil war
- •high dependency on farming (70% of workforce) for income
- •conflict in Dafur reduces food production and distribution, reducing availability and inflating prices- Moreover,tshe civil war that erupted in 2013 has escalated from a dispute between President Salva Kiir, from the dominant Dinka ethnic group, and exiled vice-president Riek Machar, an ethnic Nuer, into a full-blown crisis of deadly rivalries, cattle raiding and revenge killings.

- •after splitting, the South is much poorer than the North
- •lack of government and political will
- •bombings threaten border communities e.g. Nuba Mountains
- •war has undermined agricultural production in South Sudan

Measures taken to help Sudan during food shortage:

•UN food programme delivers food

•Red Cross Emergency relief air drops food- Since the beginning of the conflict in 2013, millions of people are in need of food, healthcare, water and sanitation, and protection. War has resulted in innumerable lives lost and 1.9 million internally displaced.
National Red Cross and Red Crescent Societies, supported by the International Federation of Red Cross and Red Crescent Societies (IFRC) are racing to help stop the crisis. Red Cross staff and volunteers – who live in the communities under threat – are working to break this preventable cycle of drought, food shortage, disease and death.

- The IFRC is supporting South Sudan Red Cross in providing the following:
  - 105,000 people to receive essential household items, such as sleeping mats, mosquito nets, buckets, soap, tarpaulins and kitchen sets.
  - 30,000 people to be given basic agricultural support including seeds and essential farming tools.
  - 37,400 people to be given access to safe water for drinking.
  - 19,200 people to receive preventative health care information and nutritional education.
  - 13,800 people to receive psychological first aid to those impacted by conflict or natural disaster.

•FAO project - rehabilitates those flooded on the Malarial river and improves watermelon growth along the river Nile- As per 2001, The UN Food and Agriculture Organization (FAO) has agreed to provide Sudan with $282,000 worth of assistance for projects aimed at sustainable agricultural development and enhanced food production.

The government of Sudan, with support from FAO, has designed a project that will be implemented under the umbrella of FAO's Special Programme for Food Security (SPFS).

•holds camps teaching women fish preservation, even using bones to create soup.

- Large-scale humanitarian assistance in the last quarter of 2017 prevented food insecurity from deteriorating for people in 17 counties and halted a real risk of famine in the Greater Baggari region. But for famine to be averted again, the response must continue through 2018.

- In the first quarter of 2018, WFP estimates it distributed 60,000 metric tons of food and US$3 million to over 2.5 million people in South Sudan---Without any humanitarian assistance, an estimated 7.1 million people—63 percent of the population—are likely to be severely food insecure during the lean season in May and July. Some 155,000 would be in IPC Phase 5 Catastrophe, one step short of famine.

An industrial zone or factory : **Toyota , Burnaston Manufacturing Plant**

The Toyota factory is located in Burnaston, near Derby (Central England). Toyota is the world's largest producer of cars and opened the burnaston factory in 1992. It employs over 2500 people and has over 200 suppliers, the majority of which are from the UK. There are a number of human and physical factors why Toyota chose Derby. Reasons :

Human factors :

- **Transport**- it is located on the junction of the A50 and A38 roads. Both these main roads have connections with the rest of the country. The plant is also near to East Midlands International Airport and has rail links to all parts of the UK. Transport links are important to receive supplies and transport finished products (cars).
- **Labour**- Derby is a traditional manufacturing location so has a large supply of skilled workers.
- **Universities** - Burnaston is near Derby, Leicester, and Nottingham universities all of whom can provide skilled graduates and research facilities.
- **Market**- The UK has a population of 65 million and the EU has a population of over 500 million which is a huge potential market for Toyota to sell cars to.
- **European union**- the UK is in the EU. By Toyota being located in the UK, it can more easily export cars to the rest of the EU.
- **Reliable electricity** - The UK has a national electricity grid which means everywhere in the country is connected to electricity. Therefore, Burnaston has a reliable electricity supply , although the Toyota factory has recently installed some solar panels.
- **Good Communication** - the UK has a very god broadband internet coverage and a comprehensive mobile and landline network. Post is fast and reliable too , making local and international communications quick and efficient.
- **Schools and Hospitals**- Derby is home to a new modern hospital (Royal Derby), and there are a number of good state schools and independent schools that workers can send their children to , eg: Derby grammar and Denstone college
- **Political incentives-** The local government was very keen for Toyota to invest in the area and helped with recruitment of the workers - they had a dedicated job centre.
- **Recreation** - Derby has a major football club (Derby County) and numerous recreation centres (eg: David Lloyd Sports Centres), gold courses, cinemas, and shopping centres (Westfield) so there is plenty for potential workers to enjoy.

Physical factors :

- **Flat Land-** The site near Burnaston was very flat and easy to build on
- **Room for expansion-** The site also has a lot of room for expansion.
- **Greenfield site-** Large parts of the site at Burnaston had not been built on so there were no clean up costs.
- **Pleasant environment -** Burnaston is right on the edge of the Peak District National Park which means workers can live and relax in pleasant environments.

Toyota (Burnaston) Industrial System

Just like all industries, Toyota operates as a system with inputs, processes and outputs. Below are some of the inputs, processes and outputs that take place at Toyota.

Inputs: The things that are needed to create a product and therefore have to be added to the industry e.g. workers or raw materials.

- 2.35million m² of land
- £1.15 billion investment to build the Burnaston factory
- 2,590 workers
- 233 suppliers (tyres, paint, steel rolls, etc.)
- 50% of suppliers are in UK
- 50% of suppliers are in Europe
- Limited number of supplies from Japan

Processes: The activities or events that take place for a product to be made e.g. designing, painting and assembling.

- Pressing (shaping) of metal panels
- Welding of metal panels and components
- Painting of car panels
- Plastic moulding
- Assembly – the putting together of all the pieces

Outputs: The things that happen or are made as a result of the production process e.g. products, waste and hopefully profit.

- Totota Avensis (68,367 cars) and Toyota Auris (68,687 cars)
- 15% sold in UK
- 70% sold in Europe
- 15% sold worldwide
- Also profit for Toyota and waste (scrap metal, etc.).

Production Line: When cars are produced they normally travel along a conveyer belt. They will start of as a shell (the body) of car and have things added to it, until it is ready to drive off the end. The conveyer belt that cars travel along is known as the production line.

TPS stands for Toyota Production system and is unique to the Toyota Manufacturing Company.

Standardisation has been introduced across all production processes and factories so people can follow simple instructions. **Kaizen** stands for continual improvement.

Jidoka means automation with a human touch.

JIT (just-in-time) means that supplies are ordered as and when they are needed.

Members: All the people that work for Toyota. Toyota encourages its members to make suggestions about improvements.

An area where tourism is important : **Goa**

This is a good Case Study to use if you have to discuss the negative effects of tourism. You can also use it as an example in "**Reasons for growth**".

Fact file

- Situated on the west coast of India, approximately 400 kilometres south of Bombay. Goa's coastal strip is approximately 100 kilometres long boasting idyllic sandy beaches and blue crystal seas.
- Traditional industries included fishing, rice growing and toddy tapping - where an alcoholic drink is fermented from the sap of the coconut palm.
- **Literacy rate 77%** - high for India.
- Number of tourist visitors now exceeds 1 million annually - about 20% are arrivals from overseas.
- Tourist season is from October through to May when average temperatures range from 31-34 degrees Celsius. Heavy rain prevents tourism from June to September.

Growth

- Tourism has grown dramatically in the last four decades.
- Until 1986 tourism was limited to Indian tourists, backpackers and the very wealthy. There were relatively few hotels and local people owned these. Backpackers could rent rooms from local families so increasing their cultural experience and injecting money into the local economy. Tourism is largely limited to the North of Goa. Tourists would total less than half a million with fewer than 30 000 from overseas.
- The consequences for the environment, culture and economy were minimal and often positive.
- 1986 saw the arrival of the first package holidays from Europe. A new demand for three and four star hotels with pools and gardens starts to put pressure on the environment. Tourism begins to spread south and numbers soon exceed 1million with more than 200 000 from overseas. Local people and action groups are starting to become concerned about the effects of tourism on the economy, environment and culture. In 1987 locals express their concerns when they great tourists at the airport with cow dung and posters telling them to go home.
- Tourism in Goa has continued to grow despite the protests of locals and action groups. Foreign tourists are being encouraged as they spend more than Indian tourists. Multinational companies increasing the likelihood of leakage are building more and more hotels. Numbers of foreign tourists are expected to rise to 350 000. There are plans to build new communication links including airports and railway stations which will open up more regions of Goa pushing tourism further north and south.

Consequences of tourism in Goa

- <u>Economy:</u>
- Largely negative although government ministers say that tourism has greatly improved the economy without the environmental consequences of traditional heavy industry.

- <u>Leakage:</u>
- There is considerable leakage of money out of the Goan economy. Foreign companies or nationals from outside Goa own the majority of large hotels. As a consequence the profits and a large percentage of the incomes will find their way out of the local

economy. In addition, a growing number of hotels now offer all-inclusive deals. Whilst attractive for the customer, these increase the amount of leakage as there is no incentive for the tourists to purchase food and drink from local businesses.

- Decline of traditional industry:
- Local industries have in many situations been forced into decline. Toddy tapping is struggling as deforestation makes way for hotels and pool. Valuable farm- land is also lost and in some instances locals claim they have been forced from the land.
- Fishing has been badly hit by trawlers but also the tradition of drying fish on the beach has been banned because the smell upsets tourists. In many areas locals are now denied access to their traditional fishing or tapping grounds by large hotel complexes. This is illegal but still appears to be occurring.

- Land prices:
- These have rocketed in recent years as speculators continue to force them up. This often prices locals and their businesses out of the market so increasing the number of businesses in foreign ownership.

Anything positive?:

- Hotel management courses set up by the local government are giving more of the local unemployed the skills to fill higher paid jobs in the industry.

- Many areas are feeling the effect of the multiplier stimulated by the money that finds its way into the economy. Tourism has had a positive effect on many businesses including... bars and restaurants, boutiques, construction, cinemas, bakeries - the key issue is whether the growth in the economy is proportional to the growth in tourism.

- Environment:
- Huge pressures are placed on the environment by the pressures of tourism. Hotels with pools and gardens replace farmland and mangrove swamps. Water tables are depleted. Again there is a counter argument that if you want to develop the area tourism is still better than heavy industry. In summary tourism in Goa is in grave danger of destroying the very thing it is trying to sell.

- Water tables:
- The water tables are being depleted so hotels can fill their pools, water their gardens and provide running water for their guests. Meanwhile locals have access to water for just two hours a day. One primary school says it no longer has drinking water for the children.

- Coastal ecosystem:
- Sand dunes and mangrove swamps are being destroyed so hotels can be built or better access to the beaches can be provided. These dunes and swamps provide a natural flood defence for villagers.

- Refuse disposal:
- The growth in tourism is rapidly outstripping the essential infrastructure. In many areas sewage treatment is inadequate, refuse disposal ineffectively regulated. As a consequence water supplies have been polluted by dumped refuse and the marine ecosystem is in danger of being irreparably damaged.

- Culture / society:

- It is here that the locals are most aggrieved. Their protests have been very visual - such as with the cow dung affair but have also become violent.
- Traditional values and cultures:
- Traditional values are being lost as local youths are influenced by the influx of Western ways. Festivals are seen as something for the tourists and so loose their significance. Goa has also achieved an un-enviable reputation in India as many see it as a haven for drugs, prostitution and nudity.

- Drugs and prostitution:
- The worst side effects of tourism are being felt in Goa. The 'hippies' of the early sixties started the trend for drugs in Goa where the plentiful supply was to their liking. Prostitution is also taking place in some resorts at its worst this can involve underage children. Pressure groups are forcing the Government to act to clamp down on prostitution and drugs. It is hoped this will also prevent the further spread of AIDS.

- Crime:
- Tourists are also starting to have bad experiences in many areas of Goa. There have been numerous incidents where tourists have been threatened, sexually abused, beaten up, robbed. It seems that tourism is encouraging the criminal element amongst the indigenous population also.

Another link for the same case study - Tourism in Jamaica

Energy supply in a country or area : **Iceland**

Renewable energy provides almost 100% of electricity production, with about 70% coming from hydropower and 30% from geothermal power.

How is the geothermal energy in Iceland produced?
Magma heats nearby rocks and underground aquifers. Hot water can be released through geysers, hot springs, steam vents, underwater hydrothermal vents, and mud pots. These are all sources of geothermal energy. Their heat can be captured and used directly for heat, or their steam can be used to generate electricity.

•About 85% of all houses in Iceland are heated with geothermal energy. In 2015, the total electricity consumption in Iceland was 18,798 GWh. Renewable energy provided almost 100% of electricity production, with about 73% coming from hydropower and 27% from geothermal power.

•There are total nine geothermal power plants.

•Five major Geothermal power plants in Iceland include Nesjavellir (120 MW), Reykjanes (100 MW), Hellisheiði (303 MW), Krafla (60 MW), and Svartsengi (46.5 MW).

•Hellisheiði Power Station : HGPS is the third-largest geothermal power station in the world. The facility is located in Hengill, southwest Iceland, 11 km (7 mi) from the Nesjavellir Geothermal Power Station. The plant has a capacity of 303 MW of electricity and 133 MW of hot water for Reykjavik's district heating.

•Nesjavellir Geothermal Power Station: (NGPS) is the second-largest geotherma lpower station in Iceland. The facility is located 177 m (581 ft) above sea level in the southwestern part of the country, near Thingvellir and the Hengill Volcano. NGPS is owned and operated by ON Power.

•The station produces approximately 120 MW of electrical power; it also delivers around 1,100 litres (290 US gal) of hot water (82-85 °C) per second, servicing the space heating and hot water needs of the Capital Region.

•Bjarnarflag Geothermal Station:located near Lake Myvatn in northwest Iceland, Bjarnarflag Geothermal Station is the smallest owned by Landsvirkjun and Iceland’s first geothermal power plant. Electricity, produced by steam from the steam supply system in Bjarnarflag is distributed to nearby households. Bjarnarflag is able to produce 18 GWh annually with its installed capacity of 3 MW (1 x 3 MW, 1 steam power unit).

•Krafla Geothermal Station: This power station is in northern Iceland; its location near Lake Myvatn makes it an ideal place for travellers in Iceland. Sightseeing is very popular in the region with lava fields and explosion crater Viti.

Benefits

- Low operational & maintenance costs, thus the power plant company can make more profits from providing electricity from geothermal power.
- Renewable source of energy, can replace coal, oil and natural gas which are running out fast. Geothermal energy is environmentally friendly compared to fossil fuel plants, as they only produce a small amount of carbon monoxide.

- Can be a tourist attraction, e.g. Bjarnarflag Geothermal Station has many tourist services nearby. Svartsengi Power Station supports Blue Lagoon, a geothermal hot spring. This could bring in more money for the region, making it more economically sustainable as tourists also go mountain climbing & skiing nearby.

Costs

- Require high investments in machinery. Hellisheidi Power Station decided last October that a number of turbines will be added, along with 90MW – these amounts to $197 million. Construction of a plant & well drilling costs ~ €2-5 million per generated MW of electricity.
- If not done with adequate care enhanced geothermal systems can trigger earthquakes, thus severely affecting land stability & putting nearby areas at risk – potential threat to settlements.
- Before access to potentially huge amounts of energy, the success rate for discovering geothermal resources in new untapped areas is ~20%. In areas near wells already producing, it is 80%.

Water supply in a country or area : **Colorado river of USA**

- It is a 2300 km long.
- Its source is in rocky mountains.
- The mouth is in the Gulf of California.
- It receives 1000 mm of rainfall in some areas, while less than 15 mm of rainfall in areas like Mojave Desert.
- 12.7 million People live on its basin; 40 million people rely on it for domestic, agricultural, industrial and energy needs.
- 29 dams, Hoover dam has created the largest artificial lake- Lake Mead
- Colorado River aqueduct (CRA) 389 km of tunnels taking water from parker dam to LA.
- On an average, 1.5 km^3 of water is pumped per year.
- Central Arizona project (CAP) is a 541 km diversion canal designed to provide water for irrigation to 405000 hectares of land (1.85 trillion lines of water per year), also for domestic use for areas like Phoenix and Tuscan.
- California state water project (CSWP) aims to provide water for 23 million people and 6.6 million Mwh of electricity to those living I southern California.
- Hoover dam at the border between US states of Nevada and Arizona, it was constructed between 1931and 1936. It generates about 4 billion kWh of hydro electric power each year for use in Nevada, Arizona and California which is enough to serve 1.3 million people.

An area where economic development is taking place and causing the environment to be at risk : **Impact of Hoover dam on river Colorado, USA**

- River bed lowering; ground water table got deeper due to lowering of Colorado river bed as water stored in Lake Mead kept digging the river bed. Therefore, plants in the floodplain were threatened because they would not reach the new depth of the groundwater table.

- Ecosystem destruction;
➔ Desert plants, like desert flower bushes.
➔ Animals; big horn sheep, ground squirrel, ring tail cat, desert tortoise, golden eagle were threatened.
➔ Human activities are destroying Colorado rivers ecosystem with change in the watershed, erosion of river banks and pollution resulting from increased vehicle traffic

- Greenhouse gases;
➔ Carbon dioxide (CO_2) and Methane (CH_4) are ejected from reservoir surfaces, turbines and spill ways of the dam.
➔ Greenhouse effect from methane is 25 times stronger than the effect from carbon dioxide.

- Endangered fishes;
➔ Eg: bony tail chub, Colorado pike minnow, humpback chub, razorback sucker are all affected due to change in water temperature. Dam turbines lower the water temperature drastically which resulted in immediate extinction of several fish species of warm water.
➔ Introduction of a cold water fish named Rainbow Trout for re-creational fishing has created competition with the native species.

- Water Evaporation;
➔ 1.3 trillion Litres (15% of water) per year gets evaporated from Lake Mead's surface which is 1000 times larger than Colorado rivers surface.

- This river used to carry 90 m tonnes of of sediments but now, majority of it is trapped being the dams, damaging the delta and wetland ecosystem.
- Water salinity has also changed, therefore, fish, shrimps, sea mammals have got reduced near the mouth of the river.
- 600 minor earthquakes were caused in a decade after its construction.
- Solutions- recycling improve irrigation techniques and improve leaks.