Updated to 2020-2022 Syllabus

CIE IGCSE
GEOGRAPHY 0460

SUMMARIZED NOTES ON THE SELECTED CASE STUDIES

1. POPULATION AND SETTLEMENT

1.1 Population dynamics

- **A country which is overpopulated: Bangladesh.**
- **Location and background:**
  o With a total population of 164.7 million to its area of 147,570 km², Bangladesh is the world's 8th most overpopulated country. It has around 1,300 people per km².
  o Its population is equally spread throughout the country.
- **Reasons for overpopulation:**
  o **Human reasons:** The average monthly earning for somebody living in Bangladesh is $150 compared to $3,500 for the people living in the United States.
  o Most people cannot afford to move out of the country.
  o **Physical reasons:** Bangladesh has the world's best agricultural land. People working in the farming industry profit a lot from it.
- **Effects:** food shortages, traffic congestion, unemployment, health problem and environmental problems.
- **Solutions**:
  o The government introduced birth control solutions in the 1980s, ever since, there is some slowdown in birth rate.
  o The fertility rate dropped from 6.4 In 1980 to 2.10 in 2016.
- **A country which is underpopulated: Australia.**
- **Location and background:**
  o With a total population of only 24.6 million people, a country size of 7.69 million km² and a population distribution of 3.1 people per km², Australia is the 7th most underpopulated country in the world.
  o It is a very rich country in resources; it has a large reserve of iron ore, coal, gold, copper, natural gas and uranium.
  o The population mostly live towards the coasts of the island, mainly South West and South East.
- **Causes for underpopulation:**
  o Most of the island is made up of a desert, with a maximum temperature of 48.8 °C, and not all people are suited for this kind of weather.
  o Not many people have migrated to Australia since its independence in 1901.
- **Effects**:
  o Shortage of food and its production
  o Shortage of labours

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o Not possible to exploit all the resources in the country
o Less people paying tax
o Schools and hospitals might close because there are not enough people supporting them
o Public transport links might be closed because there are not enough customers
o Hard to defend country

- **Solutions:**
  o Government had made it easier for migrants to come into the country and get the nationality.
  o Improved healthcare.

- **A country with a high rate of natural population growth: China (Pro-Natalist).**
- Location and Background:
  o In 1979, the population of China was 1 billion. It was estimated that by 2025, the population will reach 1.8 billion.
  o Traditionally in rural China, couples had large numbers of children to help on farmland and look after them when they are older.
  o Worry over the lack of resources to support large population
  o As a solution, China introduced the "One Child Policy" in hopes that the population would be limited to 1.2 billion in 2025 instead of 1.8 billion.

- **Solutions:**
  o Fines were introduced, and in worse case scenarios, forced abortions and sterilization took place. Incentives included pensions, healthcare and priority housing.

- **Incentives:**
  o Traditionally, boys were more valued than girls. Couples aborted or abandoned female babies, so they could try again for a boy. There is an uneven gender balance. This means not all the males will find a Chinese bride.
  o Girls traditionally looked after the elderly. Less girls being born with more girls going to work means the elderly are sometimes neglected.
  o This led to the policy allowing couples to try again if their first baby turned out to be a girl.

- Has it worked?
  o While China's population is now rising more slowly, it still has a very large total population (1.3 billion in 2008) and China faces new problems, including: the

falling birth rate – leading to a rise in the relative number of elderly people.

- **A country with a low rate of population growth (or population decline): Japan (Anti-Natalist)**
- **Location and background:**
  o Japan is located in East Asia.
  o Japan has the largest proportion of over 65s of any other country (23%) and this is expected to rise to 30% by 2030. This is causing difficulties as the number of working people declines.
- **Causes:**
  o Japan has a good healthcare provision leading to people living longer.
  o Women getting married later causing a lower birth-rate.
  o It is very expensive to bring up children in Japan (e.g. university fees).
- **Problems:**
  o Difficult to fund people's pensions.
  o Healthcare provisions are becoming stressed due to the number of elderly people.
  o Will not be enough working population to fill all the jobs available.
- **Solutions:**
  o The government is considering providing tax incentives to families and providing more childcare facilities.
  o A promotion on social and cultural change to make motherhood more attractive.
  o Labour shortage could be solved by migrant workers.
  o Japan is investing heavily in robotics to solve its labour shortages.

1.2 Migration

- **An international migration: Mexico to the USA**
- Location and background:
  o There is a 2000 km border between USA and Mexico.
  o Over 1 million Mexicans migrate to the USA every year. As a result, the US Border Patrol guards the border and tries to stop illegal immigrants. In 2006, 850,000 were caught and deported back to Mexico.
- **Push Factors:**
  o Poor medical facilities with 1800 patients per doctor.
  o Low paid jobs (GNP is $3750)
  o The adult literacy rates are only 55% - poor education prospects.
  o Life expectancy is 72 years.
  o 40% of Mexicans are unemployed
- **Pull factors:**

o Excellent medical facilities with 400 patients per doctor.
o Well paid jobs (GNP is $24,750).
o Adult literacy rates are 99% - good education prospects.
o Life expectancy is 76 years.
o Many jobs available for low paid workers such as Mexicans.

- **Effects on USA:**
  o Illegal migration costs the USA millions of dollars for border patrols and prisons.
  o Mexicans are seen as a drain on the USA economy
  o Businesses give migrant workers low wages which affects Americans that might in return receive lower wages.
  o They cause problems in cities due to cultural and racial issues.
- **Effects on Mexico:**
  o The Mexican countryside has a shortage of economically active people.
  o Young people tend to migrate leaving the old and very young.
  o Legal and illegal immigrants together send $6 billion a year back to Mexico which can go through taxes.

1.3 Population structure

- **A country with a high dependent population: Uganda**
- **Location and background:**
  o Uganda is located in East Africa, with a land area of 197,100 km^2 and a population of 42.86 million.
  o It has the world's youngest population with over 78% of its population below the age of 30.

- **Causes:**
  - The birth rate in Uganda is very high as parents are having more children.
  - Parents have more children to use as economic producers / help in their jobs (agriculture)
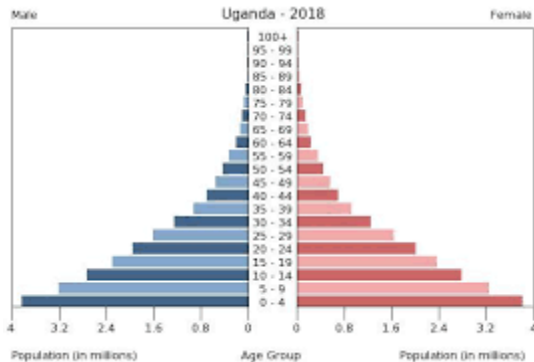
  - The infant mortality rate in Uganda is high (45.1 in 2012) so parents have more just in case.
  - There is a lack of contraception that helps protect against pregnancy.
- **Effects:**
  - A lot of money has to be spent on healthcare as there are more births, more vaccinations used and children being ill.
  - The GDP will increase as there would be a larger workforce in the long term and no laws on child labour.
  - As there are more kids, more of them would need to be educated, there would be more money spent on education.

1.4 Population density and distribution

- **A densely populated country or area (at any scale from local to regional): Japan**
- **Location and background:**
  - Japan is located in East Asia.
  - It had a population of 130 million and a population density of 336 people per km^2 in 2015
- **Causes:**
  - Sparsely populated rural areas: Very few people live on the mountainous slopes in the centre of Honshu island and the south of Shikoku island, mainly because of the lack of flat land, acidic soils and extreme climate.
  - Densely populated rural areas: many people live on the flat valleys and gentle slopes of Honshu and Kyushu islands because they have flat land with mild winters, good service provisions such as universities and technologically advanced hospitals and healthcare facilities.
- **Effects:**

  - Lack of jobs in areas due to the dense of population.
  - Some people are forced to move out of their city / area.
- **A sparsely populated country or area (at any scale from local to regional): Canada**
- **Location and background:**
  - It is located in the northern part of North America.
  - It has a population of 37 million in 2018 compared to its land area of 9.985 million km^2
  - It has a population density of 2.7 per km^2 in 2011 which makes it a sparsely populated country.
- **Causes:**
  - Many mountainous areas e.g. Canadian Rockies close to the west coast
  - Permafrost in the northern areas (high altitudes) so land is too cold for work or agriculture.
  - Snow and ice make transport difficult especially in less developed areas (e.g. the inner provinces of Canada).
  - Most of the population of Canada is clustered in the southern areas because the cold arctic climate makes cultivation impossible and better to live in cooler areas.
  - Also, people live in the Eastern areas since the West has mountainous areas that are too steep to farm on easily and challenging for construction and transport.
- **Effects:**
  - Areas with lower population are not economically active / do not have recent technology.
  - People in the areas with high population eventually have to move out of the country / area due to job unavailability.

1.5 Settlements (rural and urban) and service provision

- **Settlement and service provision in an area: Braunschweig, Germany**
- **Location and background:**
  - Braunschweig is a city in north-central Germany.
  - It is a district in Lower Saxony, Germany.
  - It has a population of around 250,000 inhabitants. The majority living in city of Braunschweig (urban).
  - Braunschweig has a land area of 192.1 km^2, with a population density of 10.5 people per km^2 compared to Germany's 3.7 people per km^2
- **Causes:**
  - It has the best provision of services:
    - More than 20 schools
    - 5 hospitals

- Dense network of public transport which includes busses, trains and trams.
- In contrast to Querum which is a village also of the district of Braunschweig, which has a population of around 6,000 with only 1 surgery doctor and 1 primary school, as it does not have the threshold population to support higher order services.

- **Effects:**
  o This has led to more migrants to Braunschweig as there is easier transport and good universities / education for children, which could lead to higher population density.

1.6 Urban settlements

- **An urban area or urban areas: Congestion in London**
- **Causes:**
  o Increased car ownership
  o Expensive public transport
  o Roads designed not for cars but for people e.g. walking lanes.
  o Population growth and rural-urban migration
- **Effects:**
  o Social: Increased respiratory problems, more cars on roads increase frequency of accidents, more traffic jams increase road rage phenomena.
  o Environmental: More vehicles on roads increase all sorts of pollution which could harm the plants and animals around.
  o Economic problems: The government has to think and invest in new road plans which could cost them millions
- **Solutions:**
  o The government had made a charge for drivers at a fixed rate of £11.50 when driving into Central Londonwhich can slow and limit the number of cars travelling across cities / areas

1.7 Urbanisation

- **A rapidly growing urban area in a developing country and migration to it: Rio de Janeiro, Brazil**
- **Location and background:**
  o Rio is in the south-east coast of Brazil.
  o It had a population of 6.9 million in 1960 but it now stands at 13.4 million in 2019
- **Push factors:**

o High infant mortality due to lack of clean water, electricity, sewerage and medical care
o Housing in rural areas is even worse than in the city.
o Lack of schools, shops, etc.
- **Pull factors:**
  o Better job prospects and higher wages in the city.
  o More schools, doctors and other services in the city.
  o Successful migrants encourage people to join large corporations located in city.
- **Effect of urbanisation:**
  o Housing pressure have caused growth of Favelas e.g. Rocinha.
  o Transport problems – congestion and pollution
  o Sanitation and Health (sewage, waste disposal, disease)
  o Increased demand for services (schools and hospitals)
  o Social problems (crime: Rio murder capital of the world)
  o Shanty towns are built on unstable land of poor materials – risk of landslides & fires
- **Management:**
  o Within the Favelas, the government has assisted people in improving their homes. Breeze blocks and other materials were given as long as people updated their homes.
  o The government also moved a lot of people out of shanty towns into low coast, basic housing estates with plumbing, electricity and transport links.
  o However, the waiting list for these properties was huge.
  o Community policing has been encouraged with greater links between the police and the local communities and businesses, but drug gangs still pose a huge problem.

2. THE NATURAL ENVIRONMENT

2.1 Earthquakes and volcanoes

- **An earthquake: Christchurch, New Zealand.**
- **Causes:**
  o An earthquake struck New Zealand's South Island on 22nd February 2011 at 12.51pm.
  o New Zealand is located on the plate boundary between the Australian (continental crust) and Pacific plates (oceanic crust).
  o The plate boundary moves in two ways- destructive, and conservative.
  o The epicentre was 10 km away from Christchurch; the second highest populated city in New Zealand

o Magnitude 6.3 on the Richter scale with a shallow-focus earthquake (5km below surface)

- **Short term effects:**
  o 181 people were killed; over half of deaths occurred in the 6-storey Canterbury Television building when it collapsed and caught fire.
  o Approximately 2000 people were treated for minor injuries.
  o 80% of the city was without electricity.
- **Long term effects:**
  o Although many buildings did not collapse some were demolished because they were unsafe. 10,000 houses would need to be re-built.
  o Could no longer host Rugby World Cup
  o Overall economic cost = NZ$ 3.5 billion
- **Short term Management:**
  o A full emergency response plan was in place within 2 hours of the earthquake happening
  o The Australian and New Zealand police enforced cordons and organised evacuations
  o 27,000 chemical toilets were flown into the area as sanitation and sewerage works were damaged.
- **Long-term Management:**
  o Insurance companies paid $898 million in building claims.
  o Text message alert systems in place.
  o Buildings reinforced with flexible steel that moves with the ground during an earthquake
  o Use of monitoring equipment to detect movement of plates.

- **A volcano: Eyjafjallajokull, Iceland**
- **Causes:**
  o Iceland is located on the Mid-Atlantic Ridge.
  o The North-American and Eurasian plates move apart- called constructive plates.
  o The disruption caused by Eyjafjallajökull was the result of a series of small volcanic eruptions, starting on the 20th March and ending in the October of 2010.
- **Short term effects:**
  o The 150m thick ice cap melted which caused major flooding to much of Iceland's infrastructure.
  o 0 reported deaths
  o Airspace closed across Europe, with at least 17,000 flights a day being cancelled.
- **Long term effects:**
  o The eruption cost insurers £65 million to customers with cancelled flights.

- **Short term management:**
  o The emergency services were prepared with advanced equipment.
  o Iceland had a good warning system with texts being sent to residents with a 30-minute warning.
  o Large sections of European airspace were closed down due to ash spreading over the continent.
- **Long term management:**
  o Eyjafjallajökull has often triggered her larger sister volcano Katla to erupt after. As a result, scientists are monitoring her closely.
  o Insurance companies and airlines have reviewed their policies to customers.
  o Some airlines have built ash monitoring equipment onto their aircraft for safety.

2.2 Rivers

- **The opportunities presented by a river or rivers, the associated hazards and their management: River Ganges, Bangladesh.**
- **Opportunities at the River Ganges:**
  o Fertile land – agriculture of rice and jute that are the 4th largest products in Bangladesh as an economy.
  o Water supply – enough for a population of 1101 per km^2
  o Fish supply – Food can feed the dense population and provide jobs for the locals
  o Flat land – that can be suitable for building.

- **Hazards (flooding):**
  o Human causes:
    ▪ Dense population of the area causing some people to live on floodplains
    ▪ Deforestation caused by the dense population.
  o Physical causes:
    ▪ The river is located next to high winds from monsoons from the Indian ocean (a major flood every 5 years)
    ▪ Tropical cyclones cause torrential rain, high winds and flooding
  o Management of the River Ganges:
    ▪ Dhaka Integrated Flood Protection Project that protects helps with flood protection works, drainage system improvements, urban environment improvement and capacity building. With a total cost of $115.9 million. $15 million was funded by OPEC.
    ▪ Rescue boats located at flood points and new flood shelters.

2.3 Coasts

- **The opportunities presented by an area or areas of coastline, the associated hazards and their management: Lyme Regis, England.**
- **Location and background:**
  o Lyme Regis is a town in West Dorset, England. It lies at Lyme Bay on the English Channel coast and the Dorset Devon border.
  o The cliffs of Lyme Regis are unstable and especially open to landslides and slumps. Many properties have already been destroyed or damaged due to the foreshore erosion over the years.
- **Opportunities:**
  o Lots of fossils located in that area that attracts tourists and fossil collectors
  o Museum about fossils that could provide an educational value for kids at school.
- **Hazards at Lyme Regis:**
  o Landslides where waves are undercutting the cliff.
  o Coastal erosion with longshore drift with a fetch of 5000 km and little protection as the beach is very wide.

- **Management:**
  o Recurved sea wall that is 150m tall that protects from easterly winds and helps stop strong storms that can influence the coastline to erode further.

2.5 Climate and natural vegetation

- **An area of tropical rainforest: Amazon Rainforest**
- **Location and background:**
  o It has a land area of 5.5 million km^2 which makes it the largest tropical rainforest on Earth
  o Sits between the Amazon river basin
  o Land for agriculture, houses and roads
  o Jobs for local workers in road building, logging, agriculture, mining and construction
  o Covers around 40% of the South American continent
  o It is a home to 1,000 species of birds and 60,000 species of plants
  o Scientific investigation into rainforest may provide new food sources and medicines.
- **Deforestation:**
  o The people's attention was caught when multiple reports in the 1980s suggested huge deforestation of the rainforest (size of Belgium every year)
  o The deforestation occurs till this day

  o The Amazon has lost about 20% of its area in the last 30-40 years.
  o Deforestation can cause the soil and the environment to become drier, causing multiple animals to become extinct
- **Advantages of human intervention:**
  o Improved transport; new roads and airports (access to raw materials).
  o Infrastructure, hospitals and education can be improved from the money gained from selling natural resources.
  o Large-scale farming brings money into the country and provides food and jobs for people.
- **Disadvantages of human intervention:**
  o The new roads divide up the rainforest and can cut off connections between different biotic and abiotic systems.
  o Land clearance for farming, transportation and mining can lead to deforestation.
  o Fertile soil that make farming possible are quickly washed away when the forest is cleared.

- **An area of hot desert: the Thar Desert, Rajasthan, India.**
- **Location and background:**
  o Located in northwest India.
  o It is one of the major hot deserts of the world with the highest population density.
  o Most people living in this desert are subsistence farmers.
- **Opportunities:**
  o Tourism as the Thar Desert National Park attracts many visitors who want to see some of the 120 species found there.
  o Farming – Irrigation has made commercial arable farming practicable.
  o Energy generation – energy is produced in the Thar Desert using solar panels.
  o Mining – Thar desert has valuable reserves of minerals containing feldspar, phosphorite, gypsum and kaolin that are minerals that are used to produce a range of things from cement to fertilisers.
- Challenges:
  o Inaccessibility as the desert covers a huge area of 200,000 km^2, it is mostly inaccessible due to the extreme environment conditions and poor infrastructure.
  o Water supply that is precious and limited.
  o Extremely high temperatures that can reach 50°C in the summer months.

3. ECONOMIC DEVELOPMENT

3.1 Development

- **A transnational corporation and its global links: Walmart**
- **Location and background:**
  - The company was founded by Sam Walton in 1962 and incorporated on October 31, 1969.
  - It's the world's largest company by revenue;
  - Total of $500 billion revenue and $20 billion profit
  - It employed 2 million people in 11,000 different outlets in 28 different countries.
  - It operates under different names e.g. ASDA in the UK.
  - 130 million weekly shoppers.
- **Global links:**
  - Started up in Arkansas with rapid growth in the US and was first abroad in Mexico then expanding to China, Canada, Hong Kong, Japan and Britain in the 90s.
  - It has over 500 ASDA stores in the UK, employing 175,000 people.
  - Imports resources from African companies for cheaper production.
  - China is its largest producer; shipping about $18 billion to the USA in 2011.
  - It's cheapest labourers are from Bangladesh.
- **Positive effects:**
  - Created many new jobs in different countries.
  - Invests in sustainable development
  - Walmart donates millions to improve health in countries it is based in.
- **Negative effects:**
  - Causes smaller shops to go out of business due to competition.
  - Not all the wages are equal across countries e.g. $6/hour in the USA but only $1/hour in China.
  - The stores take up lots of land especially in smaller states / countries e.g. Hawaii 2,100 miles^2

3.2 Food production

- **A farm or agricultural system: rice farming at Dambulla, Sri Lanka**
- **Inputs:**
  - Small land of 2 hectares.
  - Flat land due to being on the River Mahaweli.
  - Uses oxen manure as fertiliser.
  - No machinery or physical labour from children as they go to school unlike neighbouring farmers in other industries.

- Rich clay / loam soils.
- Rainfall (about 1,000mm)
- Temperature (about 28 °C)
- **Processes:**
  - Ploughing of the oxen.
  - Picking bananas e.g. in the Jathika forest.
  - Planting rice, sweet potatoes, manioc, chillies and cabbages.
  - Rice is grown in flooded fields
- **Outputs:**
  - Cabbage
  - Chillies
  - Bananas
  - Sweet potatoes
  - Rice
  - Manioc
- Income is made by hiring out oxen for £1 a day and selling fruits made (20 bananas for 25p).
- **A country or region suffering from food shortages: South Sudan**
- **Location and background:**
  - Landlocked country in East-Central Africa. The country split from Sudan in 2011.
  - Has a population of 12.6 million and a population density of 22 per km^2.
- **Seriousness of the food shortage:**
  - 4 million (40% of the population) short of food.
  - 70,000 died from hunger and diseases during the civil war.
  - Aid workers stopped WFA assistance as it was too dangerous.
- **Physical factors i.e. Drought and soil degradation:**
  - Long-term decline of rainfall.
  - Increased use of marginal land leading to degradation.
  - Drought is the main reason as it lies 15° North of the equator.
  - Pests and bad weather failed crops.
  - Diseased water - cholera and typhoid contracted
  - Prolonged drought means poor ground, with inflation of food prices.
- **Social factors i.e. poor health and population growth:**
  - High population growth – 3% a year worsens marginal land.
  - High population can lead to overgrazing and land erosion.
  - Female illiteracy of 65%
- **Economic factors:**
  - Imports from Uganda that is expensive.
  - High military spending of $1 billion.

o Limited access to buy food or infrastructure to distribute it due to the 50-year civil war.
o High dependency on farming for income (70% of the workforce).

- **Solutions to the food shortage:**
  o UN food programme delivers food.
  o Red cross Emergency relief air drops food.
  o FAO Project that rehabilitates those flooded on the malarial river and improves watermelon growth along the river Nile. It also holds camps teaching women fish preservation even using bones to create soup.

3.3 Industry

- **An industrial zone or factory: International Industrial Business Zone, Bengaluru, India.**
- **Location and background:**
  o Located in the South-East of India
  o Has a wet season monsoon with tropical savannah climate.
  o Generally flat land, especially at west at the Mysore Plateau.
  o Temperatures are between 16 °C in the winter and 36°C in the summer.
  o Population of 9.6 million, increased four times in the last 30 years.
- **How factors have influenced location:**
  o It is close to the airport (51 km).
  o Only 1 km away from a train station.
  o 500 nearby ICT companies such as Siemens.
- **How factors have influenced scale of production:**
  o Very flat land
  o Received large-scale foreign investment in high technology when Texas Instruments chose the city.
  o Cheaper labour means quick expansion was enabled from foreign outsourcing companies.
- **Benefits of the growth of Bengaluru's industry:**
  o Increasing employing rate (10% annually) in these technological centres as India is attractive due to cheap labour and tax breaks.
  o More jobs are being created due to outsourcing improving wealth (13.6% increase yearly).
  o Built new skyscrapers e.g. UB Tower 120m tall, that led to an increase in demand in apartments.
- **Negatives of the growth of Bengaluru's industry:**
  o 60% population increase in the last decade mainly from countryside to the city.
  o 5 million vehicles block roads and cause traffic jams due to its poorly laid roads.

o Large garbage problem – generates 3,000 tonnes of solid waste but only a third is composted and recycled.
o Clean sanitation water isn't completely in place as 43% live in multidimensional poverty.

3.4 Tourism

- **An area where tourism is important: Jamaica**
- **Location and background:**
  o Jamaica is a Caribbean island nation
  o 3rd largest island in the Caribbean
  o Has a population of 2.89 million.
  o Population density of 266.9 people per km^2.
- **Attraction to tourists:**
  o Climate: hot, average of 25 °C, 7 hours a day and an average of 10 hours of sunlight a day.
  o Accessibility: Plenty of airport airline flights from around the world.
  o Diving and a 7-mile-long beach (Negril Bay)
  o Cockpit caves
  o The large biodiversity
  o Blue Mountains in the East of Jamaica
- **Economic impacts from tourism in Jamaica:**
  o GDP: 24% relies on the income of the total GDP. Tourists spend $2.2 billion a year.
  o Employment: Creates new jobs in the tourism industry; employment of 90,000 people.
  o Infrastructure and services where local farms sell products such as coffee, sugar, citrus and coconuts. Allows funding of social projects e.g. education. Helps develop roads and telecommunications.
- **Disadvantages of tourism in Jamaica:**
  o Social: Inappropriate behaviour of tourists e.g. littering. Heavy use of resources by tourists. Loss of heritage and tradition.
  o Economic: Heavy consumption by tourists. Locals have low-paid jobs whereas managers have high-paid ones but are expats.
- **Management of tourism:**
  o Building national parks and museums with entry fees for profit e.g. the Negril Marine Park.
  o Ecotourism such as landscaping in Montego Bay to make it more attractive.

3.5 Energy

- **Energy supply in a country or area: Germany**
- **Location and background:**
  o Located in Western Europe with a population of 82.8 million.
  o 3 major power stations: River Ems, river coast Elbe and the river Neckar
  o They are located next to rivers, coasts and coalfields.
  o It is the largest consumer of electricity in Europe.

o Main sources of power production are coal (45%), nuclear (23%) and gas (14%), which are non-renewable.
o Except for oil, all renewable energy sources are the smallest amount produced - only 16%.
o Germany produces energy through coal fired power station e.g. Schwarze Pump Power Station.
o Advantages: Many countries have large reserves including Germany. Oil and gas can be moved efficiently by pipelines.
o Disadvantages: Lots of air pollution and can be inefficient in some locations.
o Nuclear power stations also produce energy in Germany e.g. Isar Nuclear Power Plant that produces 15% of Bavaria's electricity.
o Advantages: Very little uranium needed to make lots of energy
o Disadvantages: Radioactive waste is hard to dispose.
o By 2020, Germany will start investing in renewable energy and might be able to get its electricity fully from renewable sources by 2050.
o Advantages: Nuclear disasters avoided.
o Disadvantages: Electricity relies on neighbouring countries that still release emissions.

3.6 Water

- **Water supply in a country or area: Lesotho**
- **Location and background:**
  o Lesotho is a high-altitude, landlocked country encircled by south Africa.
  o It has a land area of 30,355 km²
  o With a population of 2.2 million and a population density of 68 people per km^2
- Its main sources of water come from the ground and surface water.
  o Surface: 5m^3 per year of internal renewable water sources.
  o Ground: 1m^3 per year of internal renewable water sources.
- **Water is used for:**
  o Municipal use where the water is used in homes (usage: 45%)
  o Industrial use where water is used in different industries (usage: 45%)
  o Agricultural use where water is used for example in irrigation (usage: 8.6%)
  o Lesotho Highlands Water Project is an ongoing water supply project with hydropower components, organised by the government and the help of South Africa.

- o They started as there was a dense population with a shortage of water.
- o It stored water from the highlands of Lesotho and would be piped into South Africa for the people to use as only 83% of the population have clean drinkable water.
- o The project is being undertaken in phases. Phase one was completed in 2004 and was intended to supply water from Lesotho to South Africa. About 4.8 billion m³ of water had been transferred by 2007.
- o The second phase of the project has been approved by the Government of South Africa. Lesotho and South Africa signed an agreement in 2010 to undertake the project.

3.7 Environmental risks of economic development

- **An area where economic development is taking place and causing the environment to be at risk: Lesotho Highlands**
- Water activity is in the East, where areas right near the coast have over 1,000mm of rainfall.
- **Economic activity:**
  - o Growing 5% annually
  - o 15% unemployed
  - o 75% are subsistence farmers
  - o Katse Dam that is 710m wide
  - o South Africa pays Lesotho £20 million a year and is royalty based, but has lots of corruption where large companies have offered bribes
- **Ways at which the environment is at risk:**
  - o Houses in 7 different villages near the Katse Dam were damaged by an earthquake.
  - o Ruined 100km of tarred road
  - o The dam has shown signs of cracking
- **Solutions to manage the risk:**
  - o 20 hectares of Katse Botanical gardens established in 1995 to reserve 150 species
  - o The Katse Botanical gardens try to promote enjoyment and knowledge of the alpine flat
  - o Fish numbers are being monitored.

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