

# DP IB Geography: SL



Your notes

## Global Trends in Consumption

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- \* Measures of Resource Consumption
- \* Availability & Consumption of Resources



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## Measures of Resource Consumption

# Poverty Reduction

## What is poverty reduction?

- **Poverty** is defined as the **lack of access** to basic necessities such as food, shelter, and healthcare
- **Poverty reduction** refers to efforts aimed at reducing or eradicating poverty
- Poverty is a complex issue that is influenced by factors such as **economic, social, and political structures**, and **inequalities**
- There are many approaches to poverty reduction, including:
  - Providing **direct assistance** (e.g. cash transfers, food aid)
  - Creating job opportunities
  - Improving access to education and healthcare
  - Promoting economic growth and development
- Poverty reduction not only reduces or eradicates poverty; it also:
  - Has positive impacts on other areas, including health, education, and gender equality
  - Can be on a small or large scale
    - Including initiatives from governments and international organisations
  - Involves addressing systemic issues such as **social exclusion**, discrimination, and inequality
  - Requires collaboration and partnerships among various stakeholders. These may include:
    - **Governments**
    - **Civil society organisations**
    - **Private sector**

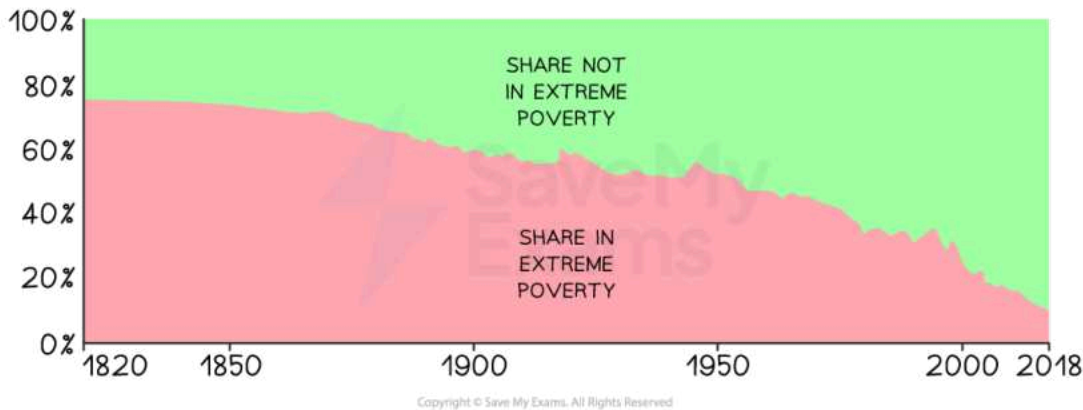
## Global progress towards poverty reduction

- The United Nations' **Sustainable Development Goal (SDG) 1** is to '**End poverty in all forms**' by 2030
- There has been significant progress towards this goal; over one billion people have moved out of extreme poverty



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- The percentage of the world population living in extreme poverty has decreased from 46% in 1968 to 8.5% in 2019
- The number of people living in extreme poverty has decreased over the same period, from 2 billion to 660 million
- Between 2020 and 2021, there was an increase in people living in extreme poverty to 750 million
  - This was due to the economic impact of the Covid-19 pandemic



### Share of population living in extreme poverty

- Despite the progress made, the goal of ending poverty by 2030 is unlikely to be achieved
  - Globally, almost 1 in 10 people still experience extreme poverty
- Poverty reduction has:
  - Occurred due to increased incomes
  - Led to the development of
    - The **new global middle class (NGMC)** – approximately 2.5 billion people
    - **Fragile middle class** – approximately 4 billion people

## Regional progress towards poverty reduction

- There are many suggested reasons for the global decrease in poverty including:
  - The rapid development of countries in Asia
  - Globalisation and trade
  - Increased participation of China, India and Eastern Europe in the global economy

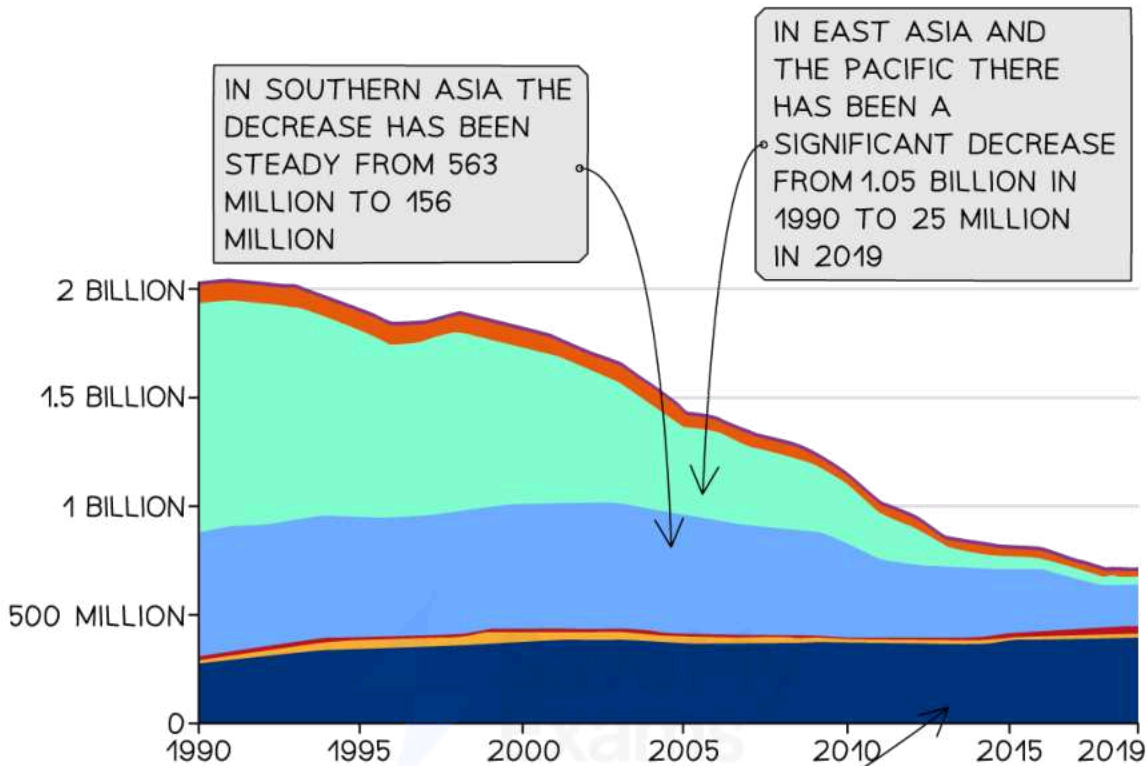
- Reduced **colonial** and **neo-colonial** influence in some countries
- Each region or country has unique characteristics
- The changes in the numbers of people living in extreme poverty will vary depending on these characteristics
- The greatest reduction in the number of people living in extreme poverty has occurred in China and India
- The only area to experience growth in people living in extreme poverty is Sub-Saharan Africa
- By 2030, it is estimated that climate change may lead to up to 130 million members of the **fragile middle class** falling back into extreme poverty



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SUB-SAHARAN AFRICA IS THE ONLY REGION WHICH HAS EXPERIENCED AN INCREASE FROM 271 MILLION TO 390 MILLION

**KEY:**

- SUB-SAHARAN AFRICA (PIP)
- EUROPE AND CENTRAL ASIA (PIP)
- MIDDLE EAST AND NORTH AFRICA (PIP)
- SOUTH ASIA (PIP)
- EAST ASIA AND PACIFIC (PIP)
- LATIN AMERICA AND THE CARIBBEAN (PIP)
- OTHER HIGH INCOME COUNTRIES (PIP)

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**Global change in the number of people living in extreme poverty**



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## Wealth inequality

- Despite the decrease in levels of extreme poverty, there has also been an increase in wealth inequality
  - The wealthiest 1% own almost 45% of the world's financial assets
  - Since 2020:
    - The wealth of billionaires has grown three times faster than the rate of **inflation**
    - The wealth of the poorest 5 billion people has fallen by 0.2%
  - This has occurred because those with wealth can invest and gain more income
- There has also been an increase in **relative poverty** in many regions
- As the wealthiest become richer the gap between them and those on lower incomes increases

## Growth of the New Middle Class

### What is the global middle class?

- The middle class is a phrase which was used to describe people between working class and upper class
- The **new global middle class (NGMC)** refers to individuals or households attaining a certain level of income and consumption
  - Typically, their wealth is above poverty levels but below the wealthiest segments of society
  - The NGMC do not yet have the affluence of the 'middle class' living in high-income countries
  - The definition of NGMC varies and can include people who:
    - Spend or earn more than US\$12 a day
    - Earn more than US\$10,000
    - Earn between US\$3,650 and US\$36,500
  - It is estimated that approximately 2.5 billion can now be categorised as NGMC
  - Increased wealth means that people have more disposable income and can buy more goods and services

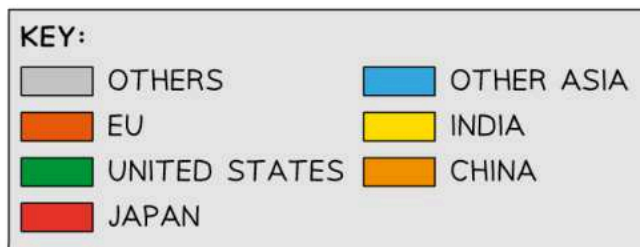
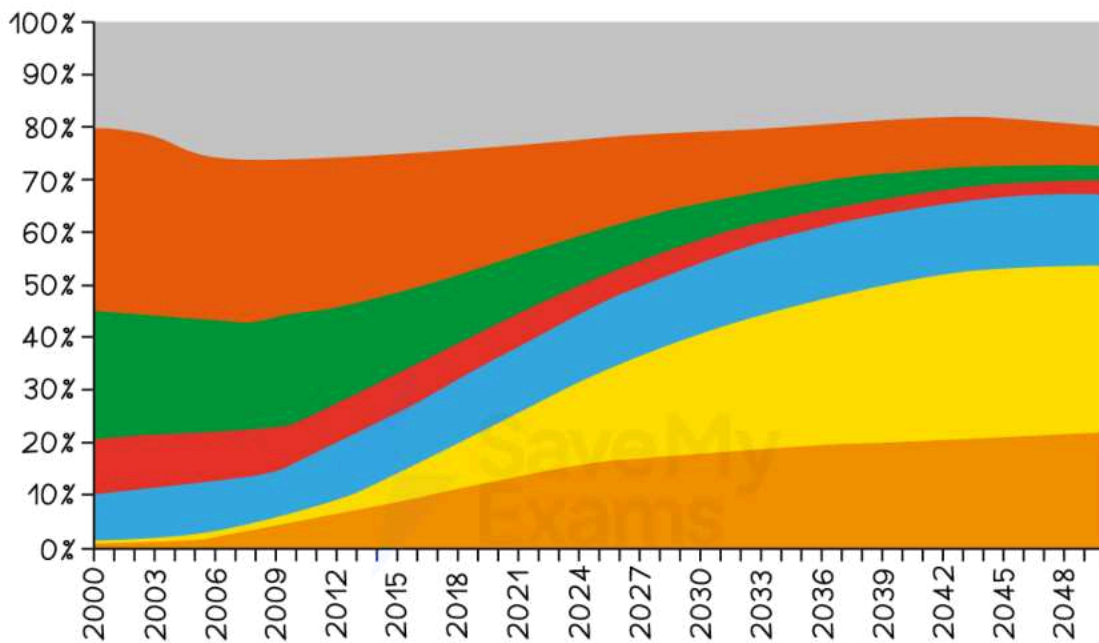
### The growth of the global middle class

- The growth of the NGMC has been a significant global trend over the past few decades
- Factors driving the growth of the NGMC include:



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- Economic growth
- Urbanisation
- Technological advances
- The size and characteristics of the NGMC vary across regions and countries, some countries experience more rapid growth than others
- India and China have experienced rapid growth of their middle class population
- The middle class populations in these two countries account for almost 50% of the NGMC consumption



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Share of middle class

## The impact of the growing middle-class

- The growth of the middle class affects



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- **Consumer behaviour**
- **Global trade and investment**
- **Social and political dynamics**
- The growth of the middle class has also been linked to several challenges, including:
  - **Environmental degradation** - increased consumption and waste lead to more pressure on the environment
  - **Resource depletion** - increased consumption means more resources are used
  - **Rising inequality** - within and between countries
- Increasing numbers of the middle class have also led to:
  - Implications for businesses and industries which operate on a global scale
  - Opportunities to address poverty and promote sustainable development
  - Middle-class customers may demand more sustainable and socially responsible products and services
  - The emergence of new markets and consumer preferences
  - Debates and discussions regarding the affordability and accessibility of goods and services
  - Consideration of the role of government in ensuring the well-being of citizens and in promoting equality

## Ecological Footprints

### Measuring trends in resource consumption

- Global resource consumption is increasing due to:
  - **Economic development**
  - **Population growth**
- Estimates of the Earth's **carrying capacity** vary
  - Most studies estimate between 8 and 16 billion people
- The higher the average consumption of resources, the lower the carrying capacity becomes
  - If everyone consumed resources at the rate of the average American, the carrying capacity would be much lower than if everyone consumed only what they need
  - The UN predicts that resource use in 2050 will be 71% higher per person than in 2022





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- The rate at which **renewable** and **non-renewable** resources are being used will affect the future carrying capacity
  - Renewable resources are those which can be naturally replenished to keep pace with the speed they are used
  - Non-renewable resources are resources which cannot be replenished at the speed at which they are used

## What is an ecological footprint?

- **Ecological footprint** is defined as the measurement of the amount of land and water a population requires to:
  - Produce the resources it consumes
  - Absorb the waste generated
- It measures the relationship between population size and resource consumption

## Calculating the ecological footprint

- The ecological footprint is calculated in acres or hectares
- **Biocapacity** is the total productivity of an area's agricultural land, built up land, forests and fishing areas
- It assesses how much productive land is needed to maintain the population at the current rate of resource consumption
- The calculation considers:
  - **Bioproductive land**, which refers to grazing land, gardens, forests, farmland for food and materials, etc
  - **Bioproductive sea**, referring mostly to fishing grounds
  - **Built environment**, needed for road and settlement construction, etc
  - Energy resources, such as land, are needed to produce renewable energy
  - **Biodiverse land** for non-human species
  - **Non-productive land**, e.g. deserts
- Other factors, such as species extinction, toxic pollution of air, water and other non-renewable energy resources, are not taken into account

## Individual footprint

- An individual's ecological footprint is a measure of their impact on the environment



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- It is calculated by measuring the amount of resources the individual consumes, including:
  - Food
  - Water
  - Energy
  - Materials
- It also includes the amount of waste individuals produce
- **Individual footprints** are:
  - Higher in wealthier countries, where people consume more material goods and energy
  - Lower in low-income countries where people consume fewer material goods and energy

## National footprint

- A national footprint is a measure of a country's ecological impact
- It is calculated by measuring the amount of resources a country consumes, such as:
  - Fossil fuels
  - Forests
  - Fisheries
- It also includes the amount of waste it generates
- The national ecological footprint varies significantly between countries, with wealthier countries typically having larger footprints due to their higher levels of consumption and industrial activity
  - Qatar has the highest ecological footprint at around 12.6 hectares per capita
  - Haiti and Malawi have footprints of less than 1 hectare per capita
- An **ecological creditor** is a country with an ecological footprint lower than their carrying capacity
- An **ecological debtor** is a country with an ecological footprint greater than their carrying capacity

## Global footprint

- A global footprint is a measure of humanity's impact on the environment
- It is calculated by adding up the ecological footprints of all countries and expressing the total in global hectares
- The global footprint is used to estimate the overall sustainability of human activities on the planet
- The global ecological footprint has more than trebled since 1961. This is due to:



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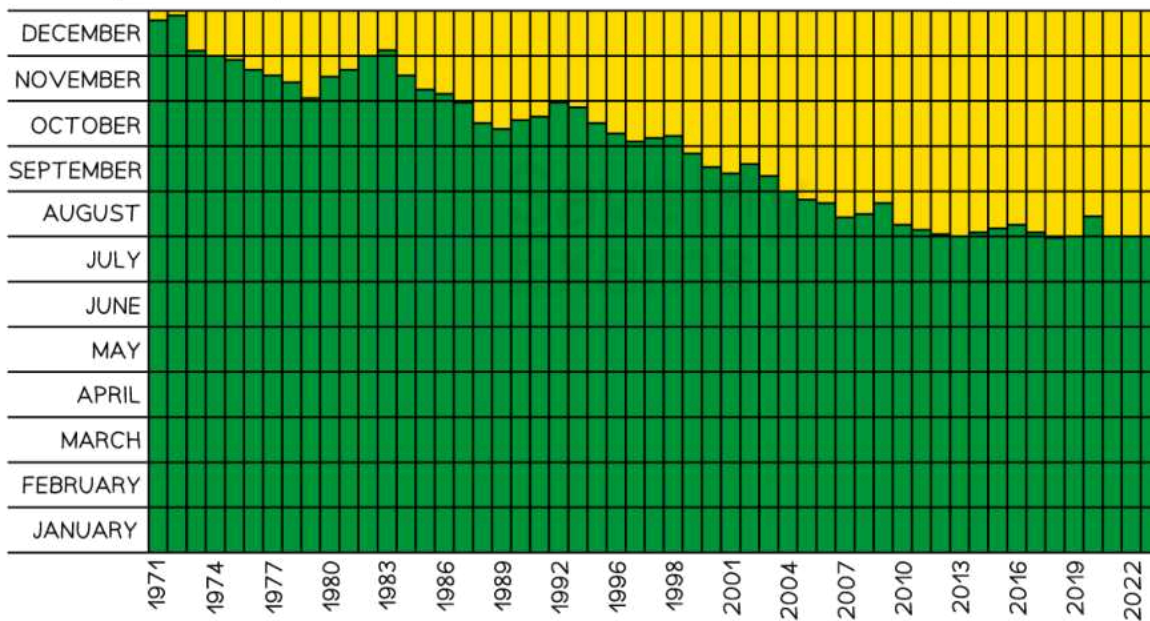
- Population growth
- Increasing consumption
- Increased production levels
- The Global Footprint Network estimates that humanity first went into **ecological overshoot** in the 1970s and has been doing so ever since
  - This means that our ecological footprint is larger than the earth's capacity to regenerate its resources
  - **Earth Overshoot Day** is calculated as the day each year when humans have used the resources the Earth has the annual capacity to regenerate
  - In 2022, it was estimated that the world's population used 1.7 Earth's worth of resources



1 EARTH



1.7 EARTH



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**World Overshoot Day**

- The consequences of this are major global environmental problems, which include:
  - Biodiversity loss
  - Climate change

- Resource depletion

## Challenges associated with calculating ecological footprints

- Ecological footprints involve analysing various interconnected systems and processes
  - It can be a challenge to accurately measure and account for these
- Environmental footprints don't give the full environmental impacts of a product
  - They do not account for the impacts of switching to a more environmentally friendly option
- Ecological footprint calculations are based on simple principles, which means they can be difficult to apply to complex situations
- Different methods of calculating ecological footprints produce different results
  - They are dependent on assumptions and data used
- Predicting future consumption patterns, technological advancements, and their associated impacts can be challenging
  - This makes long-term footprint calculations less reliable



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### Examiner Tips and Tricks

In the final exam you may be asked to describe trends shown in graphs. It is important to ensure that you:

- Identify the main trends
  - Is there an increase or decrease?
  - Is the rate of change slow or rapid?
- Use figures from the graph to support your answer
  - What are the highest and lowest figures?
  - What is the range?
- Identify any anomalies



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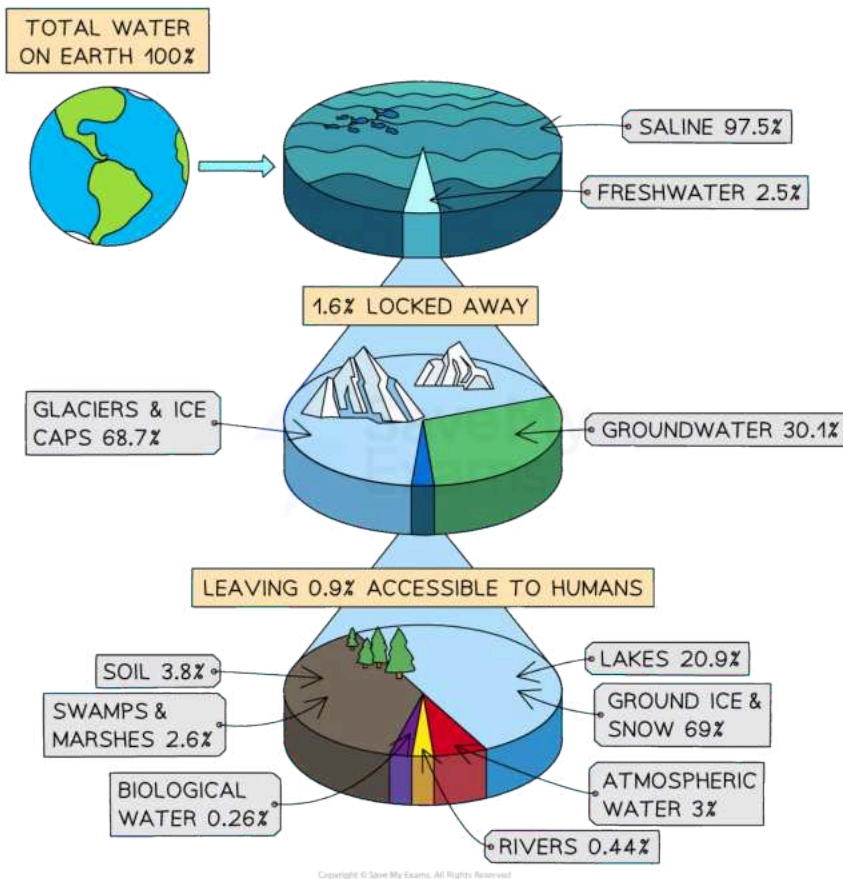
## Availability & Consumption of Resources

# Availability & Consumption of Water

## Earth's water

- **Freshwater** makes up just 2.5% of all Earth's water
- Approximately 1.6% of the freshwater is locked away:
  - The **cryosphere** holds 68.6% of freshwater as ice
  - The remaining 30.1% is **groundwater**
- In total, just 0.9% of the Earth's total freshwater is accessible to humans

## Availability of freshwater



Global availability of freshwater

- Water is unevenly distributed around the globe because of physical and human factors

### Physical and Human Factors Affecting Global Water Distribution

Physical Factors	Human Factors
The uneven spread of land to sea	Level of economic development
Geology, which enable aquifers to form	Rate of abstraction
Climatic differences: temperature and rate of precipitation	Use of water
Altitude and latitude—ice and glaciers	Embedded water
Wetlands, lakes and river size	Population numbers
Soil type: groundwater store	Affordability
	Contaminated water

- This means that people's access to water is uneven and dependent on where they live

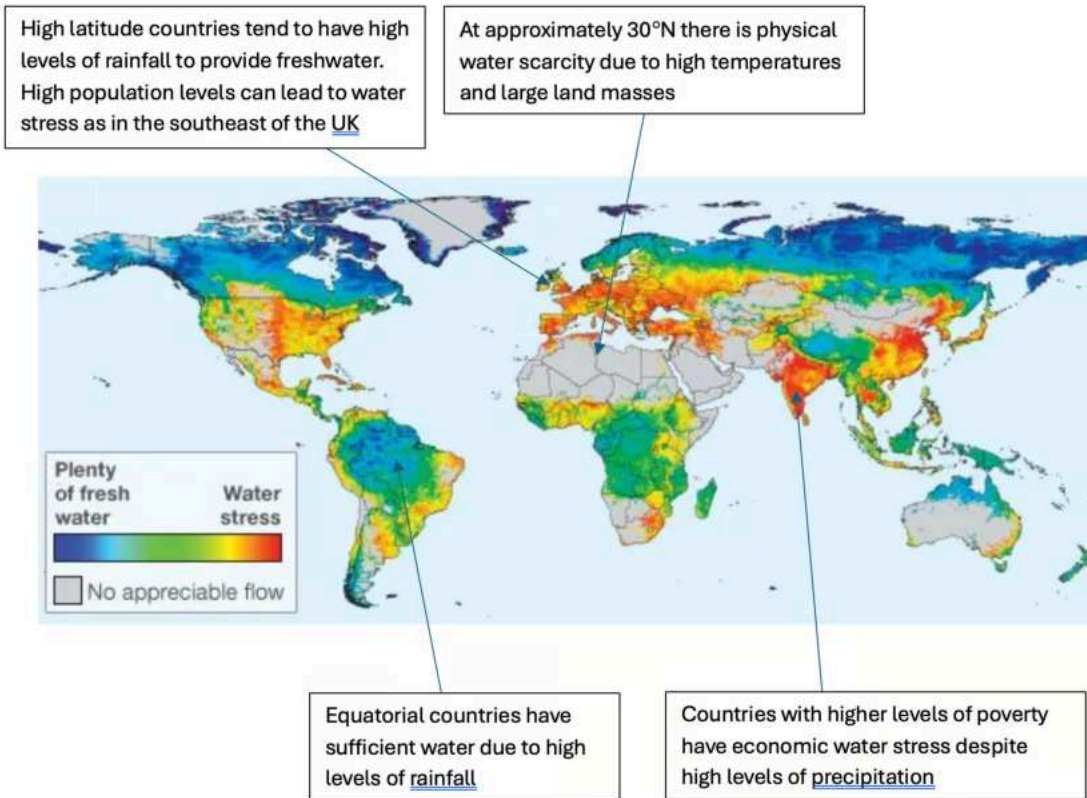
## Global availability of freshwater



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**Global availability of freshwater**

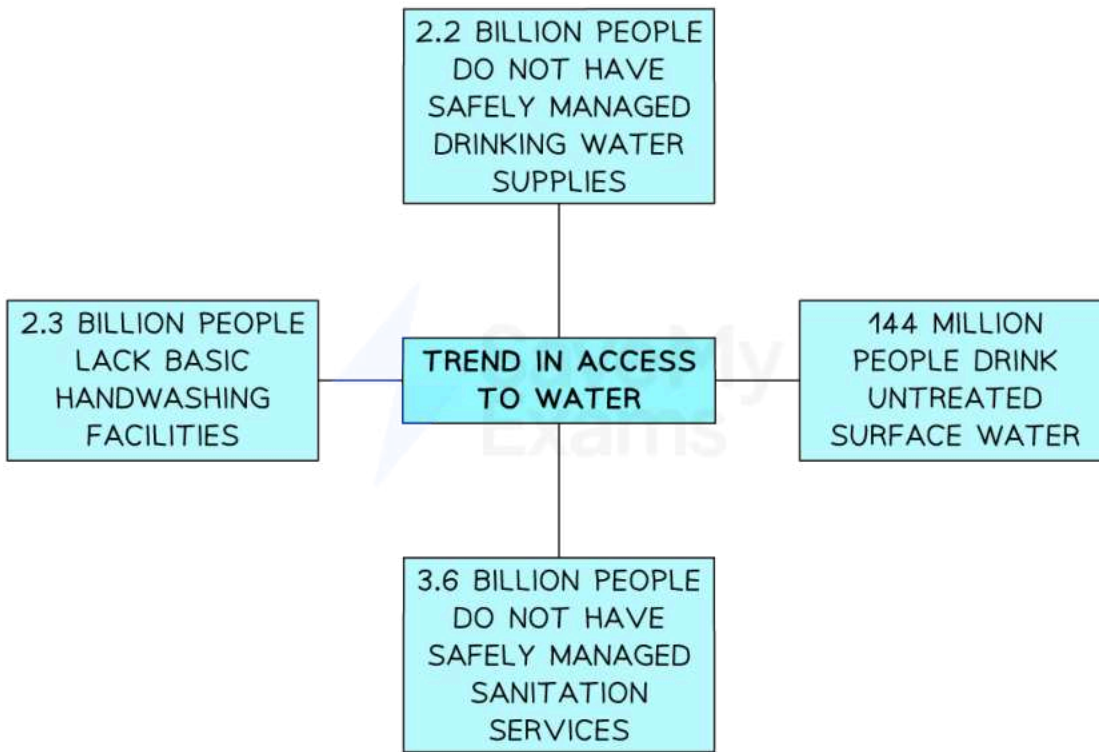
- Global climate differences create varying amounts of **groundwater**, **surface water**, and **precipitation** levels
- Availability may also be affected by population levels and wealth
- The distribution of the human population does not match the distribution of water
  - This creates areas that do not have adequate local water supplies

## Patterns and trends

- Since 2000, 1.8 billion people have gained access to basic drinking water services
- Inequalities in access remain



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***Trends in global access to water***

- According to the World Bank, inequality in access to water is the greatest threat to:
  - Economic progress
  - The eradication of poverty
  - Sustainable development
- It is the poorest and most vulnerable that suffer the most

## Increasing demand for water

- Demand for safe water is increasing due to:
  - Economic development
  - Population growth
  - Increased use of renewable energy
- At present, HICs have some of the highest levels of consumption due to:





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- Modern appliances
- Swimming pools
- Internal bathrooms
- Production of food and manufactured goods
- MICs are increasing their consumption and demand for water; much of this increase is due to industrialisation
- LICs have the smallest water footprint

## Agriculture

- **Agricultural** production of food, fibres, livestock and industrial crops **accounts for 70%** of global groundwater withdrawals
  - This figure is even higher in arid and semi-arid regions
- By 2050, there will be an estimated 50% increase in demand for food, adding extra stress on groundwater abstraction
- Much of this growth will be in LICs, which already experience water stress

## Industry

- **Approximately 17%** of total water withdrawals are used for **industrial purposes**
- Freshwater use in industry includes:
  - Dilution
  - Steam generation
  - Washing and cooling of manufacturing equipment and goods
- Industrial water is also used as a cooling agent for energy generation in fossil fuel and nuclear power plants (hydropower generation is not included in this category), or as wastewater from certain industrial processes
- At over 300 billion m<sup>3</sup>, the U.S. is the largest consumer of industrial water
- China is the second largest consumer at 140 billion m<sup>3</sup>
- Other regions use approximately one billion m<sup>3</sup> of industrial water per year, with Sub-Saharan Africa and some parts of South Asia using less than 500 million m<sup>3</sup> of industrial water per year

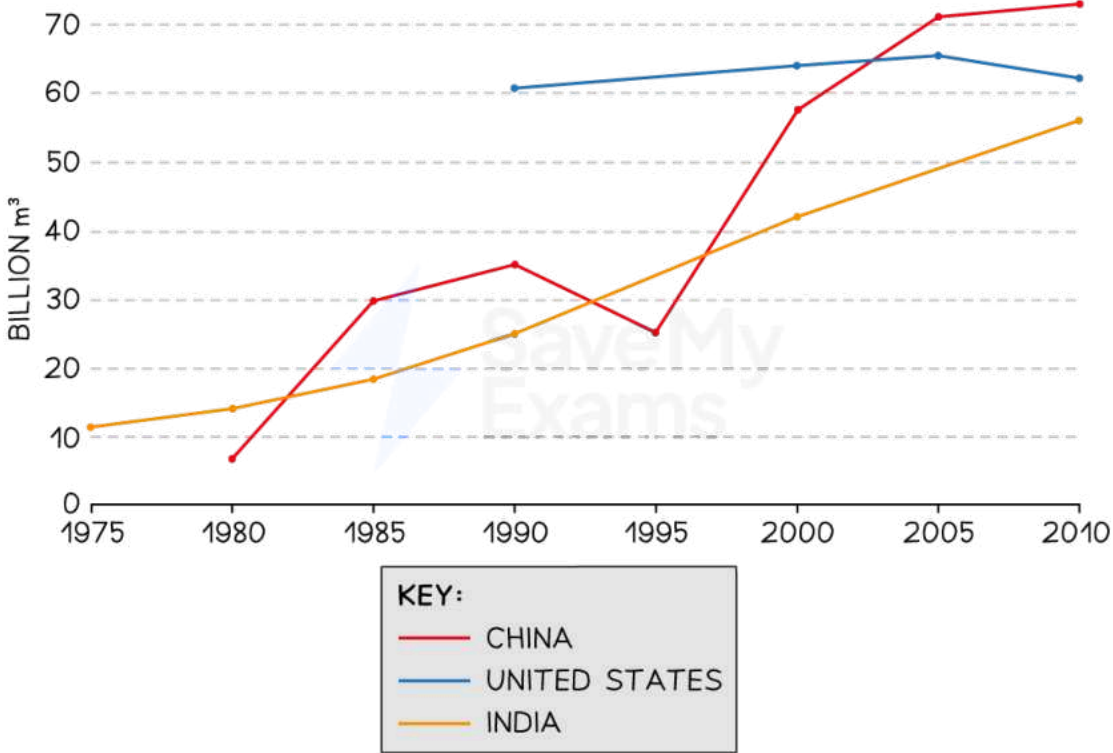
## Domestic

- The remaining 13% is used for domestic, household or public services (cooking, cleaning, washing and drinking)



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- The three countries with the highest domestic use of water are China, USA and India



*Domestic use of water in China, USA and India*

- Future demands for freshwater include:
  - Population growth
  - Growth of middle class - affluence leads to increased water consumption
  - Growth in tourism and leisure
  - Growth in urbanisation requires investment in water and sanitation infrastructure
  - Climate change and increased climatic variability of precipitation rates

## Embedded, hidden or virtual water

- This refers to water transported from one place to another through the export of foods, flowers, manufactured products, drinks, etc.
- It allows countries to reduce their water consumption by importing goods

- However, it can also lead to further water stress through exporting goods
  - The Ica Valley is in the dry, coastal region of Peru and is one of the few places in the world, where high-quality asparagus can grow all year round
  - Over 317 million cubic metres of water is needed from the aquifer to grow the exported asparagus
  - This has reduced available water in the aquifer by over 60% and at its current rate, the aquifer will run dry within the next 20 years



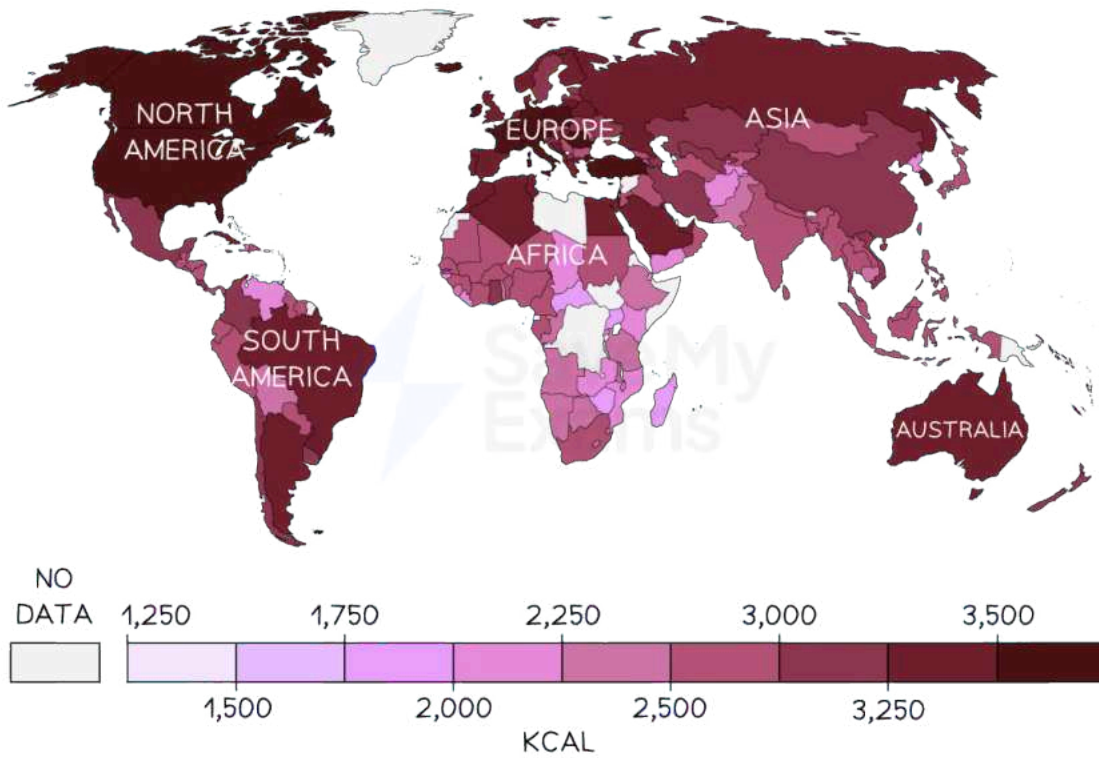
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## Availability & Consumption of Land/Food

- The world population is now over 8 billion people
- The growth of population leads to an increasing demand for food
- It is estimated by the Food and Agriculture Organisation that 60% more food will be needed to feed the world population by 2050
- Development leads to [nutrition transition](#), which also increases consumption of food
  - The lower calorie intake in many countries in Africa is due to:
    - Less food being available
    - Lower meat consumption
  - In HICs and increasingly in emerging countries, the high calorie intake is the result of increasing meat intake and more 'fast food'
    - Meat consumption in Vietnam increased from 28.6kg per person (2002) to 63.34kg per person (2020)
  - The growth of the [new global middle class \(NGMC\)](#) means that people have more disposable income
  - People are able to afford a more varied diet, which increases the consumption of imported foods
- Increased calorie intake has also led to a growth in obesity and diet related diseases



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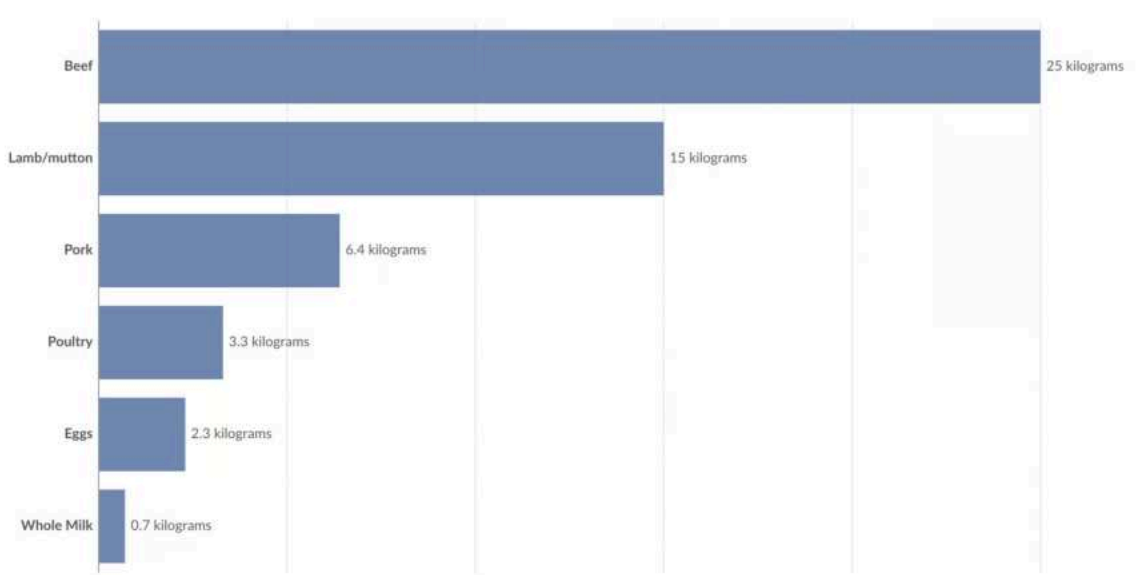
*Global calorie intake per person*

## What are the challenges of nutrient transition?

- The increase in meat consumption and changes in diet resulting from nutrition transition have a number of impacts
- Livestock farming:
  - Increases the demand for animal feed



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**Feed required to produce 1kg of food**

- Increases pressure on water supplies
- Leads to an increase in methane production, contributing to climate change
- Clearance of land for grazing and crop production increases deforestation

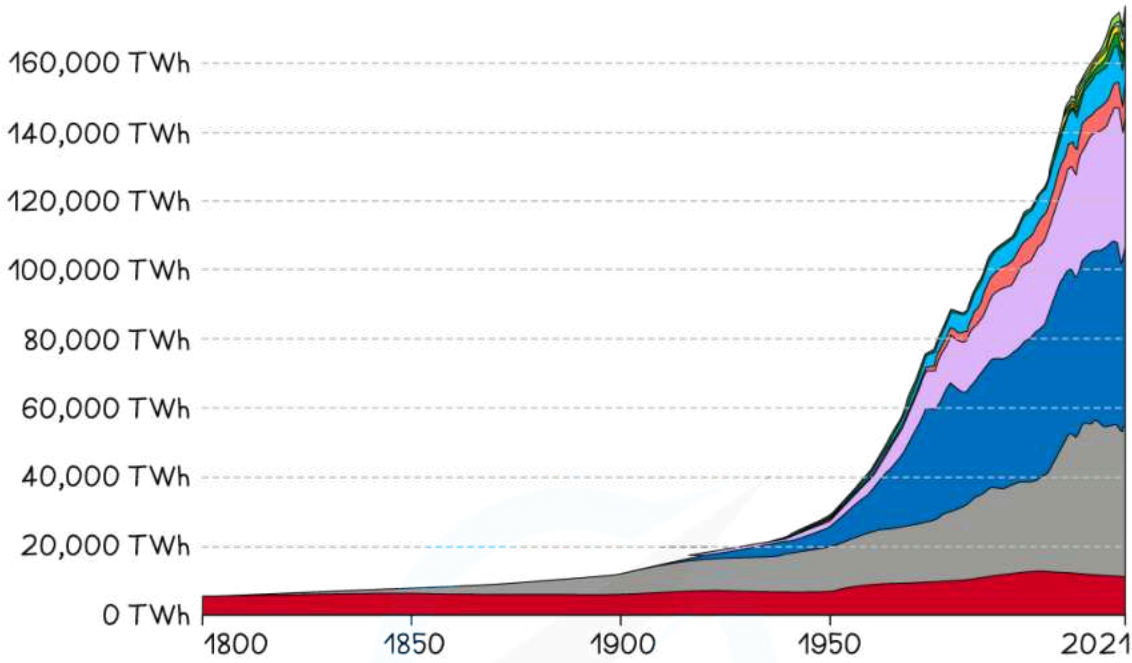
## Availability & Consumption of Energy

### The global demand for energy

- The global demand for energy has increased significantly since the 1950s
- Energy consumption can be measured in several ways, including:
  - Kilograms or tonnes of oil equivalent per year (kgoe/yr)
  - Terawatt hours (TWh) or Megawatt hours (MWh)
  - Gigajoules (GJ/yr) or exajoules per year (EJ/yr)
- It is predicted that energy demand will increase by nearly 50% by 2050



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**Global energy demand**



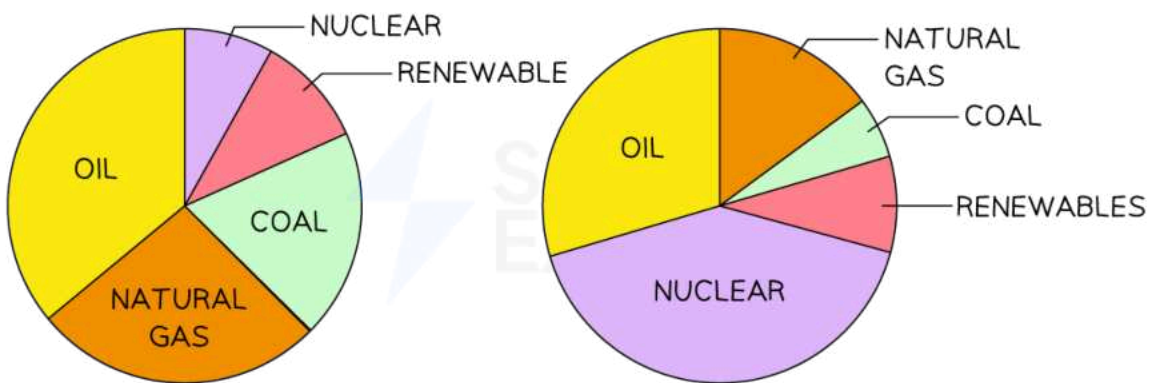
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## What are the causes of the increase in energy consumption?

- An increasing global population; the more people there are, the higher the demand for energy
- The **growth of the NGMC** means that people have more devices, appliances and vehicles which use energy
  - The increasing availability of electricity means people in LICs are moving away from reliance on fuelwood for heating and cooking
- **Development** leads to more industries, which consume increasing amounts of energy

## What is energy mix?

- Each country has a unique **energy mix** to meet their energy demand



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**Comparison of the energy mix in France and USA**

- The **primary energy** sources that are used to generate electricity include:
  - **Non-renewable** fossil fuels such as coal, oil and natural gas
  - **Renewable** energy sources such as wind, geothermal, hydroelectricity and solar
  - **Recyclable fuels** such as nuclear energy, biomass and general waste
- Each country's energy mix will vary as a result of several factors
- The energy mix of the USA is also significantly different from that of France
  - The USA only has 10% coming from renewable energy and 8% from nuclear
  - France has 10% from renewables and 41% from nuclear energy

- France relies on 46% of its energy supplies being imported, as all of its natural gas and oil are imported along with the uranium required for its nuclear power
- The USA only imports around 15%
- Countries in Asia, including China and Indonesia, rely heavily on non-renewables, particularly coal, because it is:
  - Readily available
  - Cheaper than other energy sources



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#### Factors Affecting the Energy Mix

Factor	Impact on the energy mix
<b>Level of development</b>	<p>Developing countries usually use natural resources, such as firewood for cooking</p> <p>Emerging countries will see a rise in oil use as transport and car ownership increases</p> <p>As countries develop, they tend to start using more gas and nuclear power as technology advances</p>
<b>Environment</b>	<p>Concerns about climate change have led increasing numbers of countries to reduce the use of fossil fuels</p>
<b>Safety</b>	<p>Incidents such as the nuclear accidents at Chernobyl and Fukushima mean people have concerns about the use of nuclear fuel</p>
<b>Economic</b>	<p>The cost of energy sources can affect the choices governments make</p>
<b>Technology</b>	<p>Some countries have greater access to technology</p> <p>Improvements in technology have decreased the cost of renewable energy production</p>
<b>Political</b>	<p>The conflict between Russia and Ukraine has encouraged European countries to reduce their reliance on Russian gas supplies</p>





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<b>Physical</b>	<p>Some countries have varying amounts of non-renewable energy sources, which impacts how much of these resources they use</p> <p>The geographical location also affects wind speeds, sunlight availability, water access for HEP, tidal and wave power</p>
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- It is important for countries to have a balance between domestic energy sources and imported energy sources to ensure energy security

## Changing importance of energy sources

### Decreasing use of hydrocarbons

- **Hydrocarbons**, also known as **non-renewable fossil fuels**, are becoming less popular as energy sources due to concerns about the environment
  - Climate change
  - Air pollution
  - Destruction of habitats during mining and drilling
- Hydrocarbons are finite and, at some point, will run out
- Some countries have invested in **fracking** to increase the supplies of hydrocarbons

### Increasing use of renewable energy

- Renewable energy is increasingly important in the global energy mix
- Countries want to reduce their reliance on imports of non-renewable energy sources and improve their energy security
- Reduction in the cost of renewable energy sources
- Advances in technology mean that renewable energy is more efficient
- Renewable energy has less impact on the environment

### Changes in nuclear energy

- Nuclear energy uses nuclear fission to generate electricity
- The process does not produce greenhouse gases
- Some countries, such as Germany, are reducing the use of nuclear power due to concerns regarding:
  - Safety

- Storage of nuclear waste
- Other countries, such as France, rely on nuclear power for a large portion of their energy production
- Many countries are researching and investing in nuclear fusion this would:
  - Produce significantly lower amounts of waste
  - Eliminate the risk of nuclear accidents



### Examiner Tips and Tricks

It is important not to just think in terms of individual countries. Food and energy sources are imported and exported between countries and water supply sources often cross international boundaries.



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