

SIGNIFICANCE of RESOURCES

* RESOURCES (food, water & energy) are essential for economic & social well-being.

WATER

IN THE U.K.

WATER SURPLUS → areas with too much water.

WATER DEFICIT → areas with not enough water.

CHANGING DEMANDS
 * UK Population predicted to rise by 10 million by 2040
 → many new homes being built in the S.E. which already has a water deficit.
 * People use far more water now than in the past.
 → average consumption is 150 litres per person per day in the U.K. (increase of 70% since 1975)
 → due to appliances such as washing machines and dishwashers.

SUPPLY & DEMAND
 * In the U.K., the North & West get most rain, but the South & East have the higher populations ⇒ need for **WATER TRANSFER**
 e.g. Kielder Water in Northumberland supplies Middlesbrough.
 ↳ transfer is expensive and disrupts wildlife.

WATER QUALITY & POLLUTION
 * UK rivers are much cleaner than in the past (salmon recently returned to the Thames after 100 yrs of absence).
 → still some pollution from farm chemicals, cars and chemical spillage.
 * 80% of Southern England gets water from groundwater, but half of this is at risk of pollution.
 ↳ requires expensive treatment and new laws to restrict chemical use.

High Rainfall
High Population

FOOD

* people NEED food for survival.
 → Men need approx. 2500 calories
 → Women approx. 2000 per day.

* Food is also essential for children's development
 * Without enough food, we struggle to perform everyday tasks (e.g. at school or work), and serious lack of food leads to **MALNOURISHMENT** and risk of diseases. (1 billion people currently)
 → 1/3 of under-5s globally dies from diseases linked to malnourishment.
 * World Health Organisation estimates 1 billion malnourished, 2 billion under-nourished (lacking balance of minerals & vitamins)
 * river has been diverted to produce food crops, leading to exploitation and it sometimes dries up.
 * Sub-Saharan Africa are having success with far simpler technology

* **WATER-borne diseases** are killing many people each year (cholera & typhoid)
 * Children have to walk many miles to access **WATER**, reducing time at school.

WATER

* Water is even more **ESSENTIAL** to survival than food.
 * humans can survive only 3 days without water.
 * clean, safe water is difficult to access in some parts of the world
 → in the mid 20th century, world's population was around 4 billion so there was enough water.
 → By 2025 there will be 8.1 billion, and already 1.2 billion live in areas of water scarcity

* increased **WATER** use & rising population is putting supply at risk.
 * 75% of U.K. **WATER** use is for industry.
 * many cities are visible from space at night due to huge **ENERGY** use → may have to change in future.
 * rapid industrialisation means they are using more and more **ENERGY** (mainly coal).
 * The land under the city has sunk due to extraction of **WATER** → parts of city may be underwater by 2030.
 * Supplies much of the world's oil, though their own **ENERGY** use is relatively low.

GLOBAL INEQUALITY IN SUPPLY & CONSUMPTION

COLORADO
 * huge potential for **FOOD** production but already at capacity.

WESTERN EUROPE
NORTH AFRICA
MIDDLE EAST
CHINA
BANGKOK
SUB-SAHARAN AFRICA

ENERGY

* While energy isn't essential for life, most countries now have a society that wouldn't survive without it.
 * Used for homes, but also for industry and transport
 * With industry comes jobs, wealth and economic development.
 * In countries with less electricity, people burn wood for heat & light or use kerosene stoves.
 → This is all bad for the environment, but rich countries are probably worse!!

ENERGY

IN THE U.K.

CHANGING ENERGY MIX
FOSSIL FUELS
 Traditionally we burnt coal, oil & gas to make our electricity. **1970** - 91% of our energy was from coal & oil.

RENEWABLES
 * energy sources that won't run out, e.g. wind, hydro & bioenergy (from breakdown/burning of biological material).
2014 - 19% of electricity was from renewables.

DECLINING COAL, OIL & GAS
 * Oil & Gas from the North Sea is running out.
 * The only coal left is expensive to extract and unpopular due to CO2 emissions when it's burnt!
 * Kellingley deep coal mine in North Yorkshire was the last mine to close (December 2015).
 * Fracking (extraction of gas from shale rocks by high pressure water) can cause small earthquakes and gas leaks.
 * We pay other countries to import their energy e.g. coal from Russia.
 * renewables are expensive to research & set up too.

DOMESTIC SUPPLIES (ones from our country) are running out.
 * cost of extraction is high & increases as reserves run out
 * North Sea oil is only financially worthwhile as long as oil price stays high

ECONOMIC
ISSUES ASSOCIATED WITH ENERGY EXPLOITATION
ENVIRONMENTAL
 * potential for accidents and leaks (inc. nuclear) ecosystems
 * CO2 emissions → damage to ecosystems

CHALLENGE OF RESOURCE MANAGEMENT

FOOD

IN THE U.K.
 Changing demands leads to:

WHAT DO WE WANT?...
 1) Seasonal food all year
 2) high-value imported food
 3) Organic food
 4) Cheaper food
WHEN DO WE WANT IT?... NOW!

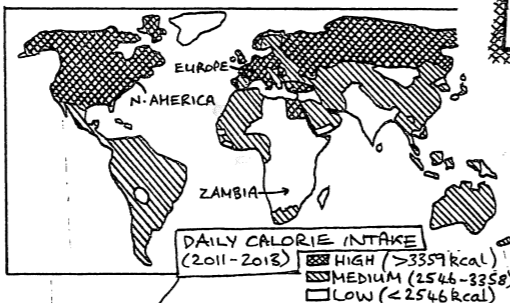
INCREASED CARBON FOOTPRINT
 * Food accounts for 17% of the U.K.'s carbon footprint
 → transportation (particularly perishable food imported by air)
 → production, processing & packaging e.g. we no longer get apples in a recyclable paper bag.
 Some people are concerned about:
 a) healthier food
 b) food miles, so:

LOCAL
 * farmers' markets, farm shops & veg boxes are increasingly popular as people try to reduce their food miles.

AGRIBUSINESS
 * farming has become big business
 * mechanisation is quicker but needs fewer workers
 → started when first combine harvester was imported after WWII. from America.
 * removal of hedgerows for larger fields
 * technology (e.g. seeds) and chemicals.

ORGANIC
 * no chemicals, making it more expensive but more high quality
 * almost £2 billion in sales in 2014 (mainly dairy products).

47% of U.K. food was imported in 2013.



FOOD CONSUMPTION ↑ BECAUSE:

- 1) **RIISING POPULATIONS** → 9 billion people by 2040 require a lot of food.
- 2) **ECONOMIC DEVELOPMENT** → wealthier countries have more disposable income to spend on food → often import foods all year round

BUT

FACTORS AFFECTING FOOD SUPPLY

- 1) **PHYSICAL**
 - ① **CLIMATE** → extreme climate (heat, cold) or weather (floods, droughts) prevent some areas
 - ② **WATER STRESS** → required to farm crops or animals
 - ③ **PESTS/DISEASES** → pests e.g. rats or locusts can eat stored or growing crops. → diseases can wipe out crops and herds e.g. 37% of the world's wheat is at risk from wheat rust.
- 2) **HUMAN**
 - ① **POVERTY** → poor people often don't own land and can't afford pesticides/fertilisers → poor countries can't afford to import food
 - ② **TECHNOLOGY** → mechanisation of farming increases efficiency, and new technology such as genetic engineering can reduce disease or increase yield
 - ③ **CONFLICT** → conflict can: → destroy land → make access tricky → disrupt trade routes → break supply chains

AND

NOT EVERYONE HAS ENOUGH FOOD = FOOD INSECURITY

- IMPACTS OF FOOD INSECURITY**
- UNDERNUTRITION** → where you eat enough but not a balance of nutrients → leads to disease
 - SOIL EROSION** → overgrazing (animals) or overcultivation (crops) leads to soil losing nutrients, drying out and being washed away.
 - RIISING PRICES** → if there isn't enough food, shops can charge higher prices → poorest can't afford to eat
 - SOCIAL UNREST** → rioting & protests against governments if they don't support the people. e.g. Burkina Faso (Africa) in 2008.

THE NEW GREEN REVOLUTION

1960s-70s green revolution was all GM crops that weren't sustainable for poor areas.
 "New" revolution is part GM crops but also traditional methods e.g. crop rotation, genetically engineered crops (GM) allow more food to be grown
BIOTECHNOLOGY e.g. C4 rice has higher yields.
 ↳ disease and drought resistant crops are great!
APPROPRIATE TECHNOLOGY e.g. a simple hand pump well doesn't require diesel to run it!
 ↳ uses local knowledge & skills

LARGE-SCALE AGRICULTURAL DEVELOPMENT EXAMPLE

INDUS BASIN IRRIGATION SYSTEM (IBIS) IN PAKISTAN
 ↳ largest continuous irrigation scheme in the world: * 3 large dams (Tarbela holds 11 billion m³)
 * 64,000 km canals distribute water across the country.
 ↳ 40% more land available to farm
 ↳ yields of wheat ↑ 36%, rice ↑ 39%, fruit ↑ 150%
 ↳ fishing and hydro power from the dams.

INCREASING FOOD SUPPLY

SUSTAINABLE MEAT & FISH
 e.g. grass-fed cattle not fed on grain
 sustainable fish species e.g. haddock rather than cod at the chip shop as cod is at risk of over-fishing

SEASONAL FOOD CONSUMPTION
 we import many fruits, out of season, producing huge pollution.
 e.g. only eating strawberries during Wimbledon

REDUCED WASTE & LOSSES
 1/3 of food is wasted globally, so encouraging people to plan food to avoid waste, use leftovers & compost.

PERMACULTURE

designed to recreate natural ecosystems, e.g. harvesting rainwater, composting, crop rotation, keeping bees.
ORGANIC FARMING
 ↳ farming using no chemicals.

LOCAL SUSTAINABLE EXAMPLE IN AN LIC/NEE
MAKUENI IN KENYA
 ↳ Marueni County has a population of 885,000, mostly living in isolated villages
 ↳ low & unreliable rainfall.
 "Just a Drop" charity & African Sand Dam Foundation in April 2014.
 * sand dams built in 2 villages, that store and filter rainwater
 * rainwater tank on the roof of the primary school.
 * training programme for farmers
 * planted trees to reduce soil erosion
 * crop yields ↑
 * water-borne diseases ↓
 * less time collecting water = more education.

SUSTAINABLE STRATEGIES