


## What are Resources?

Key term	Definition
Resources	Materials that have value for people. They may be needed for basic survival e.g. water, or appreciated as something that improves quality of life e.g. coffee.
Resource management	The control and monitoring of resources so they don't become depleted or exhausted.
Surplus	When there is more of a resource than is needed to meet demand.
Deficit	When there is not enough of a resource to meet demand.

## Global inequalities in the supply and consumption of resources


**Food**

- Average UK calorie consumption is 3200 calories per person per day.
- Average calorie consumption in Mali is 2590 calories per person per day.
- Areas of greatest population growth have highest levels of undernourishment.
- Demand depends on changing diets and increasing population.
- Supply depends on climate, soil and level of technology.




**Water**

- Fresh water is unequally distributed.
- Water footprint is the amount of water used per day.
- Global average is 1240 litres per day
- Bangladesh is 896 litres per day, USA is 2483 litres per day.
- Water scarcity (where demand is greater than supply) can be physical e.g. reduction in rainfall or economic e.g. lack of money to enable access to water.
- 1 in 5 (more than 1.2 billion people) live in areas of water scarcity.
- 1 in 3 (2.4 billion people) have no access to clean drinking water.






**Energy**

- The richest 13% of people globally use 50% of the world's energy.
- The poorest 13% of people globally use 4% of the world's energy.
- Countries import and export energy.
- Some countries do not have their own sources of energy.




## The significance of food, water and energy to economic and social well being



**Water food and energy are key for human wellbeing. All lead to social and economic benefits, which all increase the standard of living and quality of life.**

<b>Food</b>	<ul style="list-style-type: none"> <li>Calories provide energy.</li> <li>Availability of food depends on climate, soil and level of technology.</li> <li>Malnourishment leads to disease and death. In children it can lead to underperforming at school which decreases economic wellbeing in life. In adults they will be less productive (less able to work).</li> <li>Globally more than 1 billion people are malnourished.</li> <li>2 billion are undernourished (poor diet).</li> <li>Obesity is an issue in some areas, mainly HICs.</li> </ul> 
<b>Water</b>	<ul style="list-style-type: none"> <li>Used for survival, washing, food production, industry.</li> <li>Clean, safe water enables development and allows people to break free from the cycle of poverty.</li> <li>Globally 2 billion people drink from contaminated water sources.</li> <li>Over 500,000 people a year die because of diarrhoeal diseases linked to contaminated water supplies.</li> </ul> 
<b>Energy</b>	<ul style="list-style-type: none"> <li>Traditionally we get energy from oil, coal and wood.</li> <li>Many different sources are generated by changing technology.</li> <li>Used for electricity production, heating, transport and for water supply (e.g. wells).</li> <li>Supports industrialisation and development.</li> </ul> 

## Changing demand for Energy in the UK creates opportunities and challenges

<b>The changing energy mix</b>	<p>UK Energy mix in 2015 :</p> <ul style="list-style-type: none"> <li>Fossil fuels (65%) Coal 31%, Gas 25%, Nuclear 19%, Renewable sources 22%. In 1970 91% from fossil fuels.</li> <li>The UK has invested in renewable energy e.g. solar energy and subsidies are given by the government.</li> </ul>
<b>Decreasing domestic supply of oil, coal and gas.</b>	<ul style="list-style-type: none"> <li>Reserves of North Sea oil and gas are declining.</li> <li>EU regulations on gas emissions has led to a decrease in fossil fuel use.</li> <li>Energy efficient appliances and industry mean less energy is used in homes and industry.</li> </ul>
<b>Economic and environmental issues linked to energy use.</b>	<ul style="list-style-type: none"> <li>It is cheaper to import coal into the UK than to mine it.</li> <li>Nuclear Power Stations are being decommissioned and all current plants will close by 2023 – there are issues of contamination and disposal of nuclear waste.</li> <li>Economic issues – costs, jobs, set up costs, research, reliability.</li> <li>Environmental costs – ecosystems, waste, noise, emissions, pollution, radiation leaks.</li> </ul> 

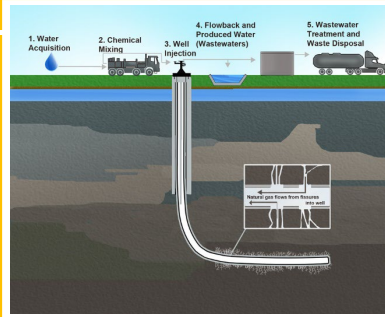
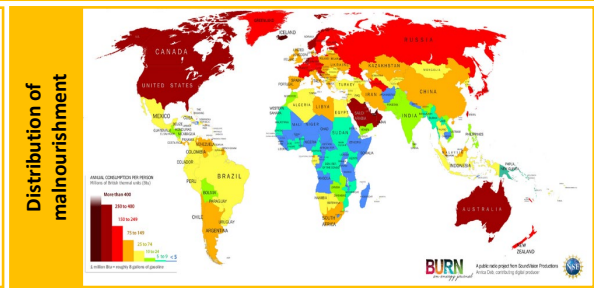
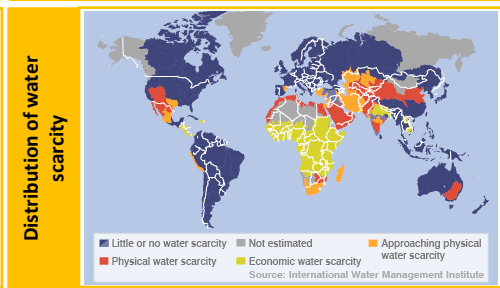
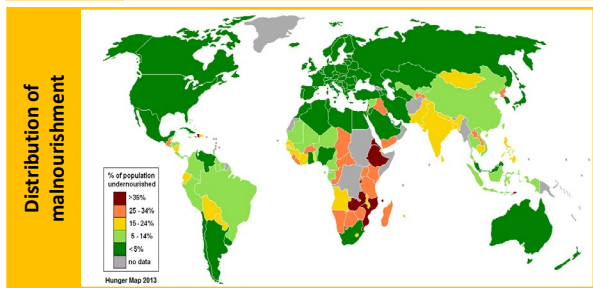
## Changing demand for food in the UK creates opportunities and challenges

<b>The growing demand for high value food exports from LICs and all year demands for seasonal food and organic produce.</b>	<ul style="list-style-type: none"> <li>Food used to be seasonally and locally sourced. Now we eat globally sourced foods all year.</li> <li>In 2013 47% of UK food was imported.</li> <li>More disposable income has led to an increased demand for greater quantities and wider choice.</li> <li>Not all foods can be grown the UK, and some foods can only be grown at certain times e.g. strawberries in July and August.</li> <li>High quality products are five times the price of similar products e.g. Madagascar vanilla, gourmet coffee.</li> <li>Positive impacts : Jobs and wages for those in LICs, more tax income leads to a better quality of life.</li> <li>Negative impacts – less land for locals to farm for themselves, high water use and exposure to chemicals (pesticides and fertilisers).</li> <li>Organic – no pesticides or fertilisers used. Since the 1990s there has been an increase in demand. Now worth £2 billion a year in the UK.</li> </ul>
<b>Larger carbon footprints due to the increased number of food miles travelled.</b>	<ul style="list-style-type: none"> <li>Food can be grown more cheaply elsewhere.</li> <li>Production and transport create a carbon footprint.</li> <li>17% of the UK's carbon footprint is due to food.</li> <li>Tomatoes have less of a carbon footprint being grown in Spain and imported to the UK than if we grew them in the UK where greenhouses would have to be heated.</li> <li>Annual food miles travelled by UK food imports is 18.8 billion miles.</li> <li>68% of food imported to the UK is from within the EU, 32% from the rest of the world.</li> <li>UK are now encouraging buying local and having an allotment.</li> </ul>  
<b>A trend towards agribusiness.</b>	<ul style="list-style-type: none"> <li>Agribusiness is a farm run as a business with the main aim being profit.</li> <li>Agribusiness has significant impacts on the environment as they are associated with heavy use of pesticides and fertilizers leading to reduction in wildlife and eutrophication.</li> <li>East Anglia has a lot of agribusinesses.</li> </ul>

## Fracking – Opportunities and Challenges

<b>Opportunities</b>	<b>Challenges</b>
<ul style="list-style-type: none"> <li>Shale gas is readily available in UK.</li> <li>Will act as a bridging fuel until alternative technologies are developed.</li> <li>Increased cost of fuel makes fracking now affordable.</li> </ul>	<ul style="list-style-type: none"> <li>Contaminated water is pumped back into the ground and can affect water supplies.</li> <li>Fracking uses a lot of energy.</li> <li>3% of gas extracted is lost to atmosphere; this is methane, a greenhouse gas.</li> </ul>

# Unit 2c The Challenge of Resource Management



Resource Security	
Key term	Definition
Food deficit	Where food demand is greater than supply
Food insecurity	Where food availability is not enough to ensure the population has enough food
Food security	Reliable availability of an acceptable quality and quantity of food
Food surplus	Food supply is greater than demand

### Global Patterns of Food Supply

The global pattern of food is very uneven.	Explanation
<ul style="list-style-type: none"> <li>Countries like China and India have high agricultural outputs.</li> <li>Countries like UK, USA and Brazil also have high outputs due to intensive farming methods.</li> <li>Countries in Sub-Saharan Africa produce less food because they have unreliable rainfall, drought, low investment and a lack of education and training.</li> </ul>	<ul style="list-style-type: none"> <li>Food security is measured using indicators like a country's level of nutrition, food stocks and political stability.</li> <li>Highest concentration of countries at risk of food insecurity are sub-Saharan Africa.</li> <li>Other countries with food insecurity include Afghanistan, Haiti and Bangladesh.</li> </ul>


### Food consumption

Rising population has Consumption varies across the world. Canada, USA and Europe have highest consumption. Some parts of the world like Sub-Saharan Africa are much lower.	<u>Global consumption has increased due to:</u> <ul style="list-style-type: none"> <li>Increasing levels of development and higher standards of living meaning people can afford to buy more food</li> <li>There are more growing populations, particularly in India, Indonesia, China and much of Africa</li> <li>There is greater availability of food due to improved transport and storage.</li> </ul>
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### Sustainable Food Supplies in Makueni, Kenya

Makeuni County in eastern Kenya has average rainfall of just 500mm. Population is 885000. Makueni mostly grows maize, beans, cassava and sweet potatoes. The area has rich dark volcanic soil high in nutrient. Low and unreliable rainfall affects the crops.

About the program:	Successes of the program:
April 2014, charity organisation 'Just a Drop' with African Sand Dam Foundation provided help to 2 small villages. It includes: <ul style="list-style-type: none"> <li>-improving access to clean and safe water supply by building sand dams for each village</li> <li>-rainwater harvesting tank on the school roof</li> <li>-increasing food security by providing a reliable source of water for crops and keeping livestock</li> <li>-a training program to support local farmers</li> <li>-growing trees to reduce soil erosion, increase biodiversity and provide medicinal products.</li> </ul> Sand dams store water in the ground, filtering and cleaning it. This allows for a cost-effective and sustainable way to provide water in rural areas.	The project has been very successful: <ul style="list-style-type: none"> <li>-crop yield and food security have increased</li> <li>-water-borne diseases have been reduced</li> <li>-less time is wasted fetching water – more time is available for work or education</li> <li>-the school now has a safe and clean water supply</li> </ul>

Factors affecting food supply	
Climate 	<ul style="list-style-type: none"> <li>Affects productivity and the types of food that can be grown.</li> <li>Regions experiencing extreme temperatures and rainfall struggle to produce food.</li> </ul>
Technology	<ul style="list-style-type: none"> <li>Food yields tend to remain low without technology.</li> <li>Poor use of technology (like poor use of irrigation) can lead to waterlogging</li> <li>In HICs, mechanisation and agribusiness give high levels of productivity.</li> </ul>
Climate Change	<ul style="list-style-type: none"> <li>Climate Change affects global farming patterns and productivity.</li> <li>Weeds and pest thrive in warmer climates.</li> <li>Rising global temps. causing pests to spread north and south of Tropics.</li> </ul>
Lack of water	<ul style="list-style-type: none"> <li>This affects many areas that suffer from food scarcity particularly in Sub-Saharan Africa.</li> <li>These areas likely to become drier and more desertified in future as temperature rises.</li> </ul>
Conflicts	<ul style="list-style-type: none"> <li>Conflicts can lead to destruction of crops and livestock. This can lead to food insecurity, famine and even death.</li> </ul>
Poverty	<ul style="list-style-type: none"> <li>Poorest people cannot afford technology, irrigation or fertilisers to improve crop conditions.</li> </ul>

### Strategies to increase food supply

Most plants get nutrients from soil but new techniques deliver nutrients directly to plants which speeds up growth of plants and allows seasonal plants to grow throughout the year. <u>Aeroponics</u> – plants are sprayed with fine water mist containing nutrients. Excess water is collected and re-used. <u>Hydroponics</u> – plants grown in mineral-rich water.	<u>Irrigation:</u> Artificial watering of the land. Often involves taking water from rivers or underground. It is needed where there are water shortages during growing season. May sometimes involve building a dam or reservoir to store water for future use.
<u>Biotechnology:</u> Uses living organisms to make or modify products or processes. This includes genetically modified crops (GM) in farming. These could have negative impacts on health and environment.	<u>The new 'green' technology:</u> A new approach focussing on sustainability and community. It uses techniques such as water harvesting, irrigation, soil conservation and improving seed and livestock quality using science and technology.

Impacts of food insecurity				
Famine	Undernutrition	Soil Erosion	Rising Prices	Social Unrest
-Widespread shortage of food, often causing malnutrition starvation and death. Some devastating famines have resulted from food insecurity. <u>Somalia</u> - 258 000 people died in 2010-2012 due to famine. Mostly children. Due to low rainfall, poor harvests and death of livestock. Worst affected areas were under control of rebels who did not allow aid, making it worse	-Lack of balanced diet, and deficiency in minerals and vitamins. About 805 million people suffered between 2012-2014. -Major public health problem, especially in southern Asia and sub-Saharan Africa. -Diets here often lack protein, carbohydrates, fats, minerals and vitamins. -Causes 300 000 deaths a year and is reason for 1/3 of children deaths.	Involves removal of fertile top layers of soil by wind and water. -Deforestation causes it as increases surface run off. -Overgrazing by animals reduce amount of vegetation and leaves more soil exposed. -Growing crops uses up valuable nutrients and land becomes infertile	Food prices rising across the world. Mainly due to increased prices of fertiliser, animal feed, food shortage, processing and transportation. -LICs and poorest people in NEEs are hit hardest by higher food costs as food represents a large portion of their spending. -Prices of sugar and rice have almost doubled since 2004.	Conflict has been common in 21 <sup>st</sup> century - especially in North Africa and the Middle East. -"Food riots" often occur due to rises in food prices. -Food dramatically increased in 2008 and in 2011. These 'spikes' contribute to more outbreaks in social unrest. -Most incidents occur in LICs or NEEs in Africa or Middle East. -In Algeria, cooking oil and flour costs doubled leading to 5 days of rioting and 4 people killed.

### Sustainable food management

<u>Organic Farming:</u> growing crops or rearing livestock without using chemicals. This makes these products more expensive.	<u>Permaculture:</u> follows patterns and features of natural ecosystems. Includes using rainwater, composting waste, crop rotations, etc.	<u>Seasonal Food:</u> using foods 'in season' and local to reduce food miles and benefit local economy.
<u>Urban Farming:</u> growing, processing and distributing food within settlements like cities. This brightens the environment in the cities and provides some jobs.	<u>Reducing food waste and loss:</u> 32% of food purchased is wasted. Half is fruit and vegetables. We can improve packaging and transportation to reduce waste.	
<u>Sustainable Fish Sources:</u> 90% of fisheries are over-fished. Intensive fish farming is kellick out stocks. Instead, we can set limits and monitor fish species.	<u>Sustainable Meat Sources:</u> a lot of energy used, chemicals used, lots of waste. Instead, we can use small-scale, free-range and organic methods that are more sustainable.	

### The Indus Basin Irrigation System: A large scale water transfer

The Indus River is important water source for India and Pakistan (both NEE). The IBIS (Indus Basin Irrigation System) is largest continuous irrigation scheme in world. It has 3 large dams that regulate water flow. Over 1.6km of ditches and streams provide irrigation for Pakistan's agricultural land.

Positive impacts	Negative impacts
<ul style="list-style-type: none"> <li>-Improves food security for Pakistan, making it 40% more land available for cultivation</li> <li>-Over 14 million hectares of land is now irrigated.</li> <li>-Irrigation has increase crop yields: (wheat (36%), rice (39%) , and fruit (150%).</li> <li>-Diets have improved due to better range of food.</li> <li>-Fish farming in storage reservoir provides protein source</li> <li>-HEP is generated in main dams.</li> </ul>	<ul style="list-style-type: none"> <li>-Some farmers take an unfair share of water, depriving others downstream/</li> <li>-High summer temps. Result in high water loss due to evaporation</li> <li>-Poor irrigation techniques mean water is waster.</li> <li>-Population growth will increase demand for water in future.</li> <li>-High costs to maintain reservoir capacity</li> </ul>