GCSE The Challenge of Resource Management – Food Knowledge Organiser

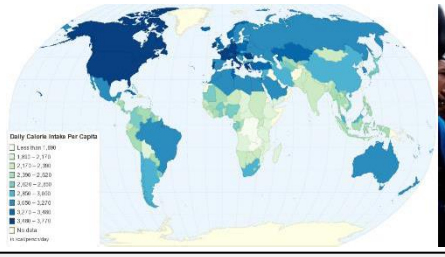
Key terms	Definitions
Food security	Having access to enough affordable, nutritious food to maintain a healthy lifestyle.
Food surplus	Countries which produce more food than is needed by their population.
Food insecurity	Countries which do not produce enough food to feed their population and have to rely on imported food have a **food deficit.** Many of these also experience food insecurity.
Food miles	The distance covered supplying food to consumers.
Carbon footprint	The measurement of the greenhouse gases that each individual produces, through the direct or indirect burning of fossil fuels.
Famine	A widespread shortage of food causing malnutrition, starvation and death.
Under nutrition	Under nutrition is the lack of a balanced diet, and deficiency in minerals and vitamins.
Irrigation	The artificial watering of land
Organic	Growing crops or rearing livestock without the use of artificial chemicals.

Global food supply

Global patterns of food consumption	• Canada, USA and Europe consume the most calories. • In sub-Saharan Africa, daily calorie intake per head is below the recommended daily intake of 2000-2400 calories
Global food consumption is increasing because	• There are growing populations • Increasing levels of development mean people can afford to buy more food • Improved transport and storage means there is more food available.
Global patterns of food supply	• USA, Brazil and UK have high outputs due to intensive farming and investment. • China and India have large populations and high agricultural outputs. Sub- Saharan African countries produce less food. They have unreliable rainfall, low investment and a lack of training.
What factors affect food supply?	• Climate- regions experiencing extreme temperatures and rainfall struggle to produce food. • Technology- in HICs, mechanisation and agribusiness give high levels of productivity. • Pests and diseases- spread from the Tropics with rising temperatures. • Water stress- lack of water affects many areas that suffer food scarcity. • Conflict- can lead to the destruction of crops and livestock. • Poverty- the poorest people cannot afford technology or fertilisers.

Impacts of food insecurity

Famine	• Famine is a widespread shortage of food often causing malnutrition, starvation and death. A famine in Somalia from 2010-2012 caused 258,000 deaths.
Rising prices	• Food prices are rising, mainly due to increased cost of fertilisers, food storage and transportation. • LICs and the poorest people in NEEs are hardest hit by food costs.
Soil erosion	Soil erosion involves the removal of fertile top soil layers by wind and water. There are several causes: • Overgrazing- animals reduce the amount of vegetation, leaving soil exposed. • Growing too many crops- uses up valuable nutrients, reducing soil fertility. • Cultivation- using marginal land (poor quality) to increase food production can lead to loss of fertility. • Deforestation for farming- removes the protective covering of the trees and increases surface run off.
Under-nutrition	• Under nutrition is the lack of a balanced diet, and deficiency in minerals and vitamins.
Social unrest	• Incidents of social unrest (food riots) are often inked to large increases in the price of food. • In 2011, the price of cooking oil and flour doubled. In Algeria this led to five days of rioting.



Increasing food supply

Irrigation	• Irrigation is the artificial watering of land. Irrigation projects can involve the construction of expensive dams and reservoirs, such as in the Indus Valley of Pakistan. They often benefit larger commercial farming. • There are smaller schemes such as in Makeuni County in eastern Kenya. Pipelines and storage tanks enable drip irrigation to support domestic food cultivation.
The 'new' green revolution.	The 'new green revolution' focuses on sustainability and community. It uses techniques such as: • Water harvesting and irrigation • Soil conservation • Improving seed and livestock quality using science and technology.
Appropriate technology	• Means using skills or materials that are cheap and easily available to increase output without putting people out of work. • Is particularly appropriate for people living in poorer countries. • An example is using a bicycle to de-husk coffee beans or corn cobs.
Aeroponics and hydroponics	• Aeroponics- Plants are sprayed with fine water mist containing plant nutrients. Excess water is re-used. This enables small scale farmers to increase yields and lower production costs. • Hydroponics- Plants are submerged in nutrient rich water and kept under specific light and heat conditions.
Biotechnology	• Uses living organisms to make or modify products or processes. • Includes the development of genetically modified crops, which produce higher yields and use fewer chemicals. • In the UK, there is opposition to GM crops because of the possible effects on the environment and human health.

Example of a large-scale agricultural development to increase food supply- The Indus Basin Irrigation System.

The Indus River runs from the Tibetan Plateau, through Pakistan to the Arabian Sea. With its tributaries, it supplies water to irrigate the drier agricultural land further south.

What is IBIS (Indus Basin Irrigation System).	• The IBIS is the largest continuous irrigation scheme in the world. • Three large dams and over a hundred smaller dams regulate water flow. • Link canals enable water to be transferred between rivers, • Smaller canals distribute the water across the countryside. • Over 1.6million km of ditches and streams provide irrigation for Pakistan's agricultural land.
What are the advantages?	• Improves food security for Pakistan, making 40% more land available for cultivation. • Irrigation has increased crop yields. • Diets have improved as a greater range of food products is available. • HEP is generated by the large dams.
What are the disadvantages?	• Some farmers take an unfair share of water. • Poor irrigation techniques mean water is wasted. • Salinisation (salty water) can damage the soil. • Population growth will increase the demand for water. • High costs to maintain reservoir capacity.

Sustainable food production

A sustainable food supply ensures that fertile soil, water and environmental resources are available for future generations.

Organic farming	• Growing crops or rearing livestock without the use of artificial chemicals. Many people choose to pay higher prices for organic produce.
Permaculture	• A system of food production which follows the patterns and features of natural ecosystems. Permaculture practices include: • Harvesting rainwater • Crop rotation • Managing woodland.
Urban farming	• Urban farming is the cultivation, processing and distribution of food in and around settlements. The Michigan Urban Farming Initiative: • The Michigan Urban Farming Initiative in the USA aims to address problems of urban decay, poor diet and food insecurity in Detroit. • Urban communities are encouraged to work together to turn wasteland into productive farmland, providing jobs and easier access to healthy food.
Fish from sustainable sources	• Almost 90% of the world's fisheries are fully or over exploited. • Sustainable fishing involves setting catch limits and monitoring fish breeding and fishing practices. • In Norway, salmon farms are spread out to reduce the possible spread of disease.
Meat from sustainable sources	• Sustainable meat production involves small-scale livestock farms, using free-range or organic methods. • Prices may be higher in the shops but quality and animal welfare standards are higher.
Seasonal and local food consumption	• In the past, food was bought from local sources when 'in season'. It is now possible in many wealthy countries to eat every type of food throughout the year. • Local food sourcing is more sustainable. It reduces both 'food miles' and our carbon footprint.
Reducing food loss and waste	• Around 32% of all food produced is lost or wasted each year. • By halving the amount of food waste, the gap between food supply and demand could be reduced by 22%. Food waste can be reduced by: • Improved food storage and distribution using refrigerated containers. • Clearer food labelling, such as 'best before' or 'use by' dates. • Using sealed plastic bags to make fresh food last longer. • More sensible approach to using food that is past its 'sell by' date.

Example of a local scheme to increase sustainable supplies of food in a LIC of NEE.

The Makueni Food and Water Security Programme	• The programme provided direct help to two small villages and Kanyenoni Primary School in Makueni County, Kenya. The programme included: • Improving water supply by building sand dams for each village. • Providing a reliable source of water for crops and livestock • Growing trees to reduce soil erosion. Sand dams store water in the ground, filtering and cleaning the rainwater as it soaks into the soil. They are cost-effective and sustainable. The project has been very successful because: • Crop yields and food security have increased • Water-borne diseases have been reduced • Less time is wasted fetching water.

Option 1: FOOD

Food Security is when people at all times need to have physical & economic access to food to meet their dietary needs for an active & healthy life. This is the opposite to Food Insecurity which is when someone is unsure when they might next eat.

Human

- **Poverty** prevents people affording food and buying equipment.
- **Conflict** disrupts farming and prevents supplies.
- **Food waste** due to poor transport and storage.
- **Climate Change** is affecting rainfall patterns making food production difficult.

Physical

- The **quality of soil** is important to ensure crops have key nutrients.
- **Water supply** needs to be reliable to allow food to grow.
- **Pest, diseases and parasites** can destroy vast amounts of crops that are necessary to populations.
- **Extreme weather** events can damage crops (i.e. floods).

Daily Calorie Intake

This map shows how many **calories per person** that are consumed on average for each country.
This can indicate the global distribution of **available food** and **food inequality.**

Food Supply

This map shows the amount of **food produced** in different countries. Whilst Asia and **North America** have **high** production outputs, **Africa** and **Central America** have **low** production outputs.

Increasing Food Supply

Hydroponics - A method of growing plants without soil. Instead they use nutrient solution.
New Green Revolution - Aims to improve yields in a more sustainable way. Involves using both GM varieties and traditional and organic farming.
Biotechnology - Genetically modified (GM) crops changes the DNA of foods to enhance productivity and properties.
Irrigation - Artificially watering the land so crops can grow. Useful in dry areas to make crops more productive.

C.S. Thanet Earth

Located in Kent, the site involves four huge greenhouses using hydroponics.

Advantages
- **Supports more than 500 jobs.**
- **Produces food all year round.**
- **Provides UK with food security.**

Disadvantages
- **Money generated mostly goes to large companies not community.**
- **Requires a lot of energy.**
- **Causes visual & light pollution.**

Sustainable Food Supply

This ensures that fertile soil, water and environmental resources are available for future generations.

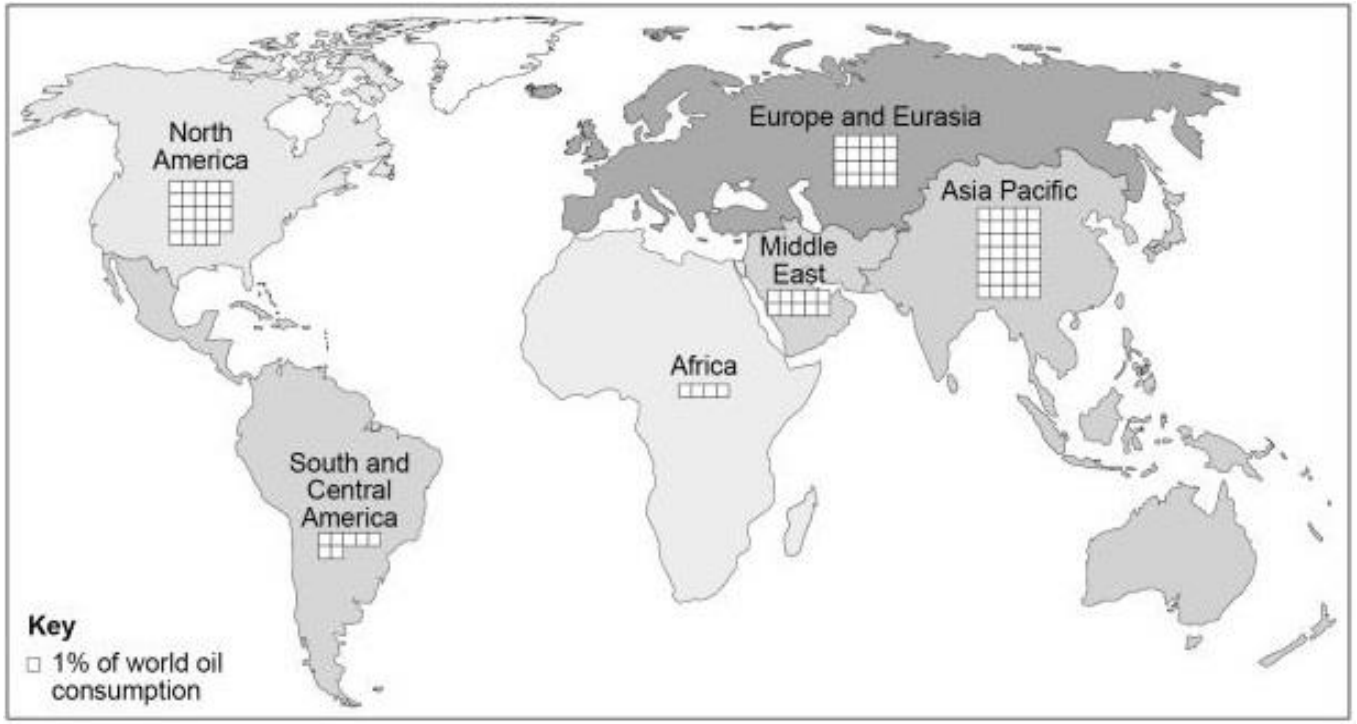
Organic Farming - The banned use of chemicals and ensuring animals are raised naturally.
Permaculture - People growing their own food and changing eating habits. Fewer resources are required.
Urban Farming - Planting crops in urban areas. i.e. roundabouts.
Managed Fishing – Includes setting catch limits, banning trawling and promoting pole and line methods.

C.S. NEE- Indus Basin Irrigation System

Largest irrigation scheme in the world. Involves large and small dams. Thousands of channels provides water to supports Pakistan's rich farmlands.

Advantages
- **Improves food security by adding 40% more land for farming.**
- **Increased yield & range of foods.**

Disadvantages
- **Few take an unfair share of water**
- **Water is wasted and demand is rising due to population growth.**
- **High cost to maintain reservoirs.**



1. What is the difference between Africa and North America's share of world oil consumption shown in the map above.
2. Using the map and your own understanding, suggest how inequalities in the consumption of resources influence well-being.
3. Outline **one** advantage of the trend towards agribusiness in the UK.
4. How does increasing food miles lead to a larger carbon footprint?
5. Outline one reason why some countries have a limited food supply.

"Use a named example to evaluate the effects of a large scale irrigation scheme"

1. BUG the question by boxing the command word and underlining the content you need to write about.
2. List the key vocabulary you will use.
3. Create a plan of what you would write in each paragraph.
4. Practice writing your answer from memory.