

The Challenge of Resource Management – MARK SCHEME

Question 1a

What is the difference between Africa and North America's share of world oil consumption shown in Figure 9?

One mark for correct calculation.

20% / 6 times greater / 500% more

Percentage sign not necessary

Question 1b

Using **Figure 9** and your own understanding, suggest how inequalities in the consumption of resources influence well-being.

Candidates should make reference to **Figure 9** through using continent / continental area name(s) and / or data provided. They should show that they can apply knowledge and understanding in analysing the pattern shown by the map. Expect recognition of a global pattern of higher consumption in wealthier regions / emerging economies, lower in poorer regions. The connection should be made with oil consumption as an indicator of wealth and therefore an ability to secure the goods and services that allow well-being. Credit reference to economic and / or social well-being.

Figure 9 shows that Asia Pacific has the largest single share of the world oil consumption. (1) Countries in this region can use this oil to develop rapidly and improve incomes through employment (1) so people are likely to have improved well-being as they can access more goods and services with this wealth (1) Africa has the lowest share of world oil consumption at 4%. (1) This links to for example Sub-Saharan Africa which has low levels of well-being measured through indicators such as HDI (1). Richer countries will have the means to purchase oil and therefore energy for personal use and industrial development (1) and this will increase the well-being of the population as they will have a good standard of living as a result (1) as visible in the North American share at 24% when that is just USA and Canada (1).

Max 1 mark if no reference to **Figure 9**.

Reserve 3rd mark (AO4) for clear and explicit reference to the map in **Figure 9**.

Question 1c

Using **Figure 10** and your own understanding discuss the issues arising from the UK's changing energy mix.

- **Level 3 (detailed) (5-6 Marks)** responses will provide a more reasoned interpretation of the relevant issues, supported with thorough understanding.

Indicative content

- **Figure 10** shows a clear shift from fossil fuels, particularly coal, to renewables in a 10 year period.
- Candidates should be making some assessment of how this shift will present issues for the UK.
- **Figure 10** should be used by reference to Figures given or description that is accurate enough to infer use of the resource rather than learned knowledge.
- Candidates should also be bringing their own understanding to the answer through discussion, which may be in terms of opportunities and challenges (shown below), or in assessment of the relative scale of either positive or negative issues alone.
- Credit any reasonable issues that result for example:
- Opportunities: new industries in renewables; increased employment in some areas as a result e.g. Humber estuary; reduced air pollution and thereby climate change risk.
- Challenges: unemployment in coal mining areas; greater risk of waste with increased use of nuclear; meeting demand surges with renewable energy such as wind, which cannot easily be stored.

Question 2a

Name one country where less than 5% of the population were undernourished.

One mark for any correctly named country: Brunei, Japan, Malaysia, South Korea.

Question 2b

How many of the Asian countries shown in Figure 11 had 15–24.9% of their population undernourished?

C: 8 (1 mark)

What percentage of the 24 countries in Asia for which data is shown had 15–24.9% of their population undernourished?

33.3% (1 mark)

Percentage sign not required. Answer must be to one decimal place.

If the candidate has made a mistake in the first part then allow the corresponding answer to the second part of the question:

A – 25.0%, B – 29.2%, D – 37.5%

Question 2c

Describe the distribution of countries which had 15–24.9% of their population undernourished as shown in Figure 11.

Answers should make use of Figure 11 through naming countries and affected areas in order to describe the pattern and should be focussed on the 15-24.9% category.

One mark for a basic statement, e.g.

- The biggest area is South Asia. (1)
- All but three of the countries are neighbours. (1)
- The largest group of countries is south of China. (1)

Second mark may be a second separate point or developed point for further descriptive clarity, e.g.

- The biggest area is South Asia (1) with a clear group to the south of China of 4 of the 7 countries (d) (1)
- Almost all of the countries are neighbours (1) with just two isolated examples, one to the south east of India and the other on China's northern border (d) (1)
- There is a group to the south of China (1) with isolated countries to the north of China and one other in SE Asia (d) (1)

No credit for description of any categories other than 15-24.9%.

No credit for a list of named countries even if correct

No credit for explanation.

Question 2d

Outline one reason why some countries have a limited food supply.

Answers should be focused on explanation of problems with food supply in general. There is no requirement to use Figure 11 but candidates may do so to aid their explanation. The specification lists: climate, technology, pests and disease, water stress, conflict and poverty as contributing factors but any reasonable explanation should be credited.

One mark for a basic statement e.g.

- Some countries are poor. (1)
- When there is conflict / war.(1)
- Dependence on staple crops. (1)

Two marks for a developed idea e.g.

- Some countries are poor (1) so they are unable to buy food (d) (1) if the prices rise on world markets. (d) (1)
- When there is conflict / war (1) food supplies can't get through. (d) (1)
- Dependence on staple crops (1) means that people may be fed but the supply is still poor as people suffer malnutrition. (d) (1)

Question 2e

Explain how different strategies can be used to make food supplies more sustainable.

- **Level 3 (detailed) (5-6 Marks)** responses will cover more than one strategy with at least one in detail and make strong connection between the strategy and sustainability of food supplies.

Indicative content

- An understanding of sustainability should be seen in the answer (defined as meeting the needs of the present generation without compromising the ability of future generations to meet their needs) and also of food supply (defined as the physical availability of enough safe and nutritious food to meet health needs).
- The question does not specify scale or geographical location so any valid approach is acceptable.
- The specification lists: organic farming, permaculture, urban farming initiatives, fish and meat from sustainable sources, seasonal food consumption, reduced waste and losses as strategies, therefore the answer will much depend on the content selected.
- An example may be used to support the answer.
- Candidates should then utilise this information to show how the approach is likely to be sustainable in the long term.

Max L1 for large scale or unsustainable strategies

Question 3a

Name one country with a 91–100% access to basic drinking water services.

One mark for any correctly named country: Algeria, Egypt, Libya, Tunisia.

Question 3b

How many of the African countries shown in Figure 12 had less than 50% access to basic drinking water services?

C: 10 (1 mark)

What percentage of the 48 countries in Africa for which data is shown had less than 50% access to basic drinking water services?

20.8% (1 mark)

Percentage sign not required. Answer must be to one decimal place.

If the candidate has made a mistake in the first part then allow the corresponding answer to the second part of the question:

A – 16.7%, B – 18.8%, D – 22.9%

Question 3c

Describe the distribution of countries which had 76–90% access to basic drinking water services as shown in Figure 12.

Answers should make use of Figure 12 through naming countries and affected areas in order to describe the pattern and should be focussed on the 76-90% category.

One mark for a basic statement, e.g.

- Nearly all on the coast (1)
- The biggest area is Southern Africa. (1)
- Apart from one group of 3 they are all isolated. (1)
- 4 out of the 8 are in Western Africa. (1)

Second mark may be a second separate point or developed point for further descriptive clarity, e.g.

- Nearly all on the coast (1) except Botswana (d) (1)
- The biggest area is Southern Africa (1) with the 3 largest countries in the category all next to each other (d) (1)
- Apart from one group of 3 they are all isolated (1) and quite evenly spaced along the central and western coastline (d) (1)
- 4 out of the 8 are in Western Africa (1) with the other 3 all grouped together on the southern tip of Africa (d) (1)

No credit for description of any categories other than 76-90%.

No credit for explanation.

Question 3d

Outline one reason why some countries have a limited availability of water.

Answers should be focussed on explanation of limits to water availability in general. There is no requirement to use Figure 12 but candidates may do so to aid their explanation. The specification lists: climate, geology, pollution of supply, over-abstraction, limited infrastructure and poverty as contributing factors but any reasonable explanation should be credited.

Note that hot deserts are optional so do not expect or over-reward specific knowledge such as the descending Hadley Cell.

One mark for a basic statement e.g.

- Some countries have limited rainfall. (1)
- Poor countries may not be able to store water for later use. (1)
- Poor countries may have economic water scarcity. (1)

Two marks for a developed idea e.g.

- Some countries are located in dry regions (1) with limited rainfall (d) (1) which means that even slight reductions will reduce availability further. (d) (1)
- Poor countries may not be able to store water for later use (1) so they are unable to make the most of water available during wet seasons which would increase availability. (d) (1)
- Poor countries may have economic water scarcity (1) so that water is unavailable simply because people cannot afford to buy it. (d) (1)

Question 3e

Explain how different strategies can be used to make water supplies more sustainable.

- **Level 3 (detailed) (5-6 Marks)** responses will cover more than one strategy with at least one in detail and make strong connection between the strategy and sustainability of water supplies.

Indicative content

- An understanding of sustainability should be seen in the answer (defined as meeting the needs of the present generation without compromising the ability of future generations to meet their needs) and also of water supply (defined as physical availability of safe water to meet their health needs).
- The question does not specify scale or geographical location so any valid approach is acceptable.
- The specification lists: water conservation, groundwater management, recycling, and grey water, therefore the answer will much depend on the content selected.
- An example may be used to support the answer.
- Candidates should then utilise this information to show how the approach is likely to be sustainable in the long term.

Max L1 for large scale or unsustainable strategies

Max L2 for explanation of conservation methods only

Question 4a

Name one country which had less than 10.0% of energy consumption from renewable sources.

One mark for any correctly named country:

Belarus, Belgium, Cyprus, Ireland, Luxembourg, Netherlands, Ukraine, United Kingdom

Question 4b

How many of the European countries shown in Figure 13 had 35.0–49.9% of energy consumption from renewable sources?

C: 7 (1 mark)

What percentage of the 41 countries in Europe for which data is shown had 35.0–49.9% consumption of energy from renewable sources?

17.1% (1 mark)

Percentage sign not required. Answer must be to one decimal place.

If the candidate has made a mistake in the first part then allow the corresponding answer to the second part of the question:

A – 12.2%, B – 14.6%, D – 19.5%

Question 4c

Describe the distribution of countries which had 20.0–34.9% consumption of energy from renewable sources shown in Figure 13.

Answers should make use of Figure 13 through naming countries and areas in order to describe the pattern and should be focussed on the 20.00-34.99% category.

One mark for a basic statement, e.g.

- There is a group of these countries towards south-eastern Europe. (1)
- There is a belt of countries in this category running east from Italy's NW border. (1)
- 5 of the relevant countries e.g. Portugal and Denmark are not next to another in the same category. (1)

Second mark may be second separate point or developed point for further descriptive clarity, e.g.

- A number of the countries are towards south-eastern Europe (1) with another 5 on the western, northern and north-eastern edges of mainland Europe. (1)
- There is a belt of countries in this category running east from Italy's NW border (1) this begins with Slovenia and runs east to Romania. (d) (1)
- 5 of the relevant countries e.g. Portugal and Denmark are not next to another in the same category (1) and there is also a Slovenia, Croatia, Serbia, Romania 'axis' in the south east. (d) (1)

No credit for description of any categories other than 20.00-34.99%.

No credit for explanation.

Question 4d

Outline one reason why some countries have a limited energy supply.

Answers should be focused on explanation of limited energy supply in general. There is no requirement to use Figure 13 but candidates may do so to aid their explanation. The specification lists: physical factors, cost of exploitation and production, technology and political factors as contributing factors but any reasonable explanation should be credited.

One mark for a basic statement e.g.

- Some countries have low incomes. (1)
- They lack supplies of fossil / other fuels. (1)
- Some countries have no control over the energy companies. (1)

Two marks for a developed idea e.g.

- Some countries have low incomes. (1) so they are unable to buy energy no matter how low the price. (d) (1)
- They lack supplies of fossil / other fuels (1) which means that they are dependent on other countries for their energy supply. (d) (1)
- Some countries have no control over the energy companies. (1) so even if the supply globally is good they cannot say how it is distributed. (d) (1)

Question 4e

Explain how different strategies can be used to make energy supplies more sustainable.

- **Level 3 (detailed) (5-6 Marks)** responses will cover more than one strategy with at least one in detail and make strong connection between the strategy and sustainability of energy supplies.

Indicative content

- An understanding of sustainability should be seen in the answer (defined as meeting the needs of the present generation without compromising the ability of future generations to meet their needs) and also of energy supply (defined as the extent to which an energy is available to meet their needs).
- The question does not specify scale or geographical location so any valid approach is acceptable.
- The specification lists: individual energy use and carbon footprints, energy conservation: designing homes, workplaces and transport for sustainability, demand reduction, use of technology to increase efficiency in the use of fossil fuels, therefore the answer will much depend on the content selected.
- An example may be used to support the answer.
- Candidates should then utilise this information to show how the approach is likely to be sustainable in the long term.

Max L1 for large scale or unsustainable strategies

Max L2 for explanation of renewable energy sources or conservation methods only

Question 5a

Calculate the percentage increase in mango imports into the UK between 2012 and 2016.

Answer to the nearest whole percentage.

One mark for correct working if final answer incorrect.

Allow one mark for mathematically correct answer (73.68/73.7%) without rounding correctly to a whole number.

Allow 2 marks for correct answer and no working.

74%

Percentage not required

Question 5b

State one environmental effect of the increase shown in Figure 9.

Credit any reasonable answer eg:

Increased carbon emissions; increased carbon footprint for the UK; increase in food miles.

No credit for any consequence other than environmental

Question 5c

Outline one advantage of sourcing food locally in the UK.

Credit **one** advantage only.

Candidates should clarify how the advantage arises, which may be at any scale.

One mark for a basic statement, eg:

- money goes straight to the farmer (1)
- lower food miles (1)
- people know where their food comes from (1).

Two marks for a developed idea, eg:

- money goes straight to the farmer (1) which means they have an increased share/are more profitable (d)(1)
- lower food miles (1) which means the carbon emissions associated with food will decrease (d) (1)
- people know where their food comes from (1) which helps connect producers and consumers for community benefits (d)(1).

No credit for disadvantages of imported food.

Question 5d

Outline one advantage of the trend towards agribusiness in the UK.

Credit **one** advantage only.

Candidates should clarify how the change in scale and intensity of production that characterise agribusiness have created opportunities, which may be for a wide range of people, or the UK as a whole.

One mark for a basic statement, e.g.

- Farmers can make more profit. (1)
- 'Farm to fork' integration allows producers / supermarkets to maximise profits. (1)
- Food is cheaper. (1)
- Reduces imports (1)

Two marks for a developed idea, e.g.

- Large farms have taken over small ones (1) so they can reduce costs in using machinery across a wider area and increase profits. (d)(1)
- Supermarkets and large growing organisations such as Produce World have prospered (1) as they control every stage from growing to final sale (d)(1) and don't lose money to any middle-men. (d)(1)
- Reduced costs of production mean prices can be kept lower (1) so food prices are lower in real terms than 30 years ago (d) (1) / so the shopper benefits. (d)(1)

No credit for disadvantages.

Question 6

Discuss the challenges of managing water quality and pollution in the UK.

Use Figure 10 and your own understanding.

Level 3 (5-6 Marks) responses will provide a considered interpretation with discussion of the issues, supported with thorough understanding.

Indicative content

- **Figure 10** shows a clear improvement in serious pollution incidents since 2001 with rivers the cleanest since records began.
- On the other hand sewage and effluent, principally from farmland remain issues and more than half of rivers remain polluted.
- Candidates should be showing awareness of how this pattern will present issues for the UK.
Figure 10 should be used by reference to facts or figures given or description that is accurate enough to infer use of the resource rather than learned knowledge.
- Candidates should also be bringing their own understanding to the answer through discussion of the issues that result.
- Credit any reasonable issues that result for example:
- The cost of any clean ups; the scale of the problem with almost one incident per day and half of rivers affected by phosphorous; future situation is only likely to get worse with population growth and climate change.

Question 7a

What was the difference in protein consumption per person per day between China and the UK in 2013?

One mark for the correct figure:

6 (g per capita per day) units not required

Question 7b

Complete Figure 11 using the following data.

One mark for each correct plot then correctly joined with a line.

If both plots correct but one or no lines, 1 mark.

Question 7c

Describe the trend for China shown in Figure 11.

Answers should make use of **Figure 11** through quoting years and/or figures in order to describe the trend.

One mark for a basic statement, eg:

- China has gone up the most steeply (1)
- China rose after 1977 (accept 1980) (1)
- China has fluctuated (1)

Second mark may be a second separate point OR developed point for further clarity eg:

- China has gone up the most steeply (1) with approximately 100% increase over the time period (d) (1).

Question 7d

Suggest why food consumption in a country might change over time.

Candidates should show that they understand changing patterns of food consumption.

Expect recognition that food consumption increases as a consequence of increased wealth and development.

Credit any reasonable explanation eg:

At lower stages of development countries rely on subsistence farming (1) which is dominated by the production of staple cereal crops (1) as countries increase in wealth they are able to buy more food (1) this can mean an increase food consumption (1) as these products are more expensive foodstuffs (1). There is also a change to more 'westernised' diets (1) which will involve increased meat consumption (1).

Question 7e

'A large scale agricultural development can bring both advantages and disadvantages.'

Explain this statement using an example you have studied.

- **Level 3 (5-6 Marks)** responses will cover both advantages and disadvantages with at least one in detail and link these to the nature of the development named.

Indicative content

- Clearly the exact content will vary according to the development chosen, but is likely to include:

Advantages

- ✓ Increased food production
- ✓ Increase in cash crops/export earnings
- ✓ Cheaper food
- ✓ Improved food security
- ✓ Job creation

Disadvantages

- ✗ Fewer rural jobs
- ✗ Profits made by large companies
- ✗ Small scale farmers lose land/priced out
- ✗ Increased water/pesticide/energy use
- ✗ Plastic pollution
- ✗ Visual pollution

Question 8a

Calculate the difference between the average Californian usage and restrictions in Cape Town on 1 February 2018.

One mark for the correct figure:

271 litres units not required

Question 8b

Use the data in Figure 12 to complete the graph in Figure 13.

One mark for each correctly drawn bar (width can be ignored).

Bar need not be shaded

Question 8c

Describe the trend shown in Figure 13.

Answers should make use of Figure 13 through quoting figures and dates in order to describe the trend.

One mark for a basic statement, eg:

- the amount of water people can use has gone down (1)
- people are now allowed only half what they were in Feb 2017 (1).

Second mark may be a second separate point or developed point for further clarity eg:

- the amount of water people can use has gone down (1) though it has not been a steady decline (1)
- people are now allowed only half what they were in Feb 2017 (1) so that now they can only use 1/6 of what a Californian uses (d) (1).

No credit for explanation.

Question 8d

Outline one or more likely impacts of water insecurity.

Candidates should show that they understand the link between limited water supply and resulting consequences.

Credit recognition that the impacts worsen over time.

Credit any reasonable impacts eg:

Conflict may increase (1) between regions or countries who share a water supply as they wish to secure control (1). Food production/yields may decrease (1) because it is harder to find the water to irrigate crops (1) so they may not grow so well (1). Manufacturing output may decrease (1) as water intensive industries can't produce so much (1) which can impact on the country's GDP (1). Disease may increase in poorer countries (1) as insecure supply means people are forced to drink polluted water (1).

Question 8e

'A large scale water transfer scheme can bring both advantages and disadvantages.'

Explain this statement using an example you have studied.

- **Level 3 (5-6 Marks)** responses will cover both advantages and disadvantages with at least one in detail and link these to the nature of the development named.

Indicative content

Clearly the exact content will vary according to the development chosen, but is likely to include:

Advantages

- ✓ Increased access to water for agriculture and industry
- ✓ Increased domestic water availability
- ✓ Cheaper water
- ✓ Cleaner water – and consequent health implications
- ✓ Employment opportunities

Disadvantages

- ✗ Economic costs of construction
- ✗ Environmental consequences eg disturbance of habitats
- ✗ May create conflict eg over water rights downstream
- ✗ Disruption of communities

Question 9a

Complete Figure 14 using the following data.

One mark for each correctly drawn bar (width can be ignored).

Bars need not be shaded.

Question 9b

Calculate the difference between the 2018 percentage from renewables and the 2035 target.

One mark for the correct figure:

31% percentage not required

Question 9c

State two alternatives to large solar farms suggested in Figure 15.

Solar panels on roof tops, expand renewables on the mainland, upgrade undersea cables.

Question 9d

Suggest how energy supply issues can lead to conflict.

Candidates should show that they understand the link between understanding of energy (in)security and conflict.

Credit any reasonable impacts which do not have to come from Figure 15 e.g. There is dispute about the best strategy for supplying energy (1) this can be because people in existing industries see their jobs at risk (1). Energy costs may increase (1) which can cause conflict between those who can afford it and those who can't (1). There may be independence issues as parts of a country look to leave the mainland (1) because they see that they can secure their energy supply by leaving and not having to 'share'

Question 9e

'Extraction of fossil fuels can bring both advantages and disadvantages.'

Explain this statement using an example you have studied.

- **Level 3(5-6 Marks)** responses will cover both advantages and disadvantages of a named fossil fuel with at least one in detail.

Indicative content

Extraction includes the use of the fossil fuel

Clearly the exact content will vary according to the fossil fuel chosen, but is likely to include:

Advantages

- ✓ Employment opportunities
- ✓ Increased energy security (at least in the short term)
- ✓ Development of local infrastructure
- ✓ Provide energy for new industries
- ✓ Export opportunities
- ✓ Reliable source of energy

Disadvantages

- ✗ Disruption of local communities
- ✗ May affect other industries eg tourism, agriculture
- ✗ Water contamination
- ✗ Habitat destruction
- ✗ Land contamination
- ✗ Increased traffic
- ✗ CO₂ emissions

Question 10a

What is organic farming?

Credit any reasonable description eg

- Growing food / producing meat or dairy / Farming without the use of chemicals.
- Farming that doesn't use artificial fertilisers or pesticides.
- Only natural techniques used for the growing of food.

Question 10b

Explain why there is a growing demand in the UK for food from LICs.

Credit any reasonable factor or development of point eg

Rising demand for fresh/seasonal produce all year round (1) such as strawberries from Mexico (1). There is an increased demand for exotic fruit and vegetables (1) as people's incomes have increased (1). The UK does not have the climate to grow certain crops (1) such as rice which is imported from India (1).

Supermarkets import food from LICs as it is cheaper (1). The UK is only 58% self-sufficient in fruit and vegetables (1).

1x3, 3x1, or (1+1)+1

Accept examples from NEEs.

No credit for examples explicitly naming HICs.

Question 11a

What is meant by famine?

A lack of food for a significant number of people / Widespread shortage of food.

One mark for a correct statement with words to the effect above ie idea of shortage and spatial or numeric extent being large.

Question 11b

Complete Figure 11 using the following data.

One mark for each correct choropleth completion, including correct use of key.

Question 11c

Describe the distribution of the countries which had 5–14.9% of their population undernourished between 2016 and 2018 as shown in Figure 11.

Answers should make use of **Figure 11** through naming countries and locations in order to describe the distribution.

One mark for a basic statement, eg

- The majority are in west Africa. (1)
- There are two clusters in west Africa. (1)
- Only two (credit reference to one) are found in southern Africa. (1)

Second mark may be a second separate point or developed point for further clarity eg

- The majority are in west Africa (1) with just South Africa and Lesotho in the south. (d) (1)
- There are two clusters in west Africa (1) with one other separate area in the south. (d) (1)
- Only two (credit reference to one) are found in southern Africa (1) with the majority being west African coastal countries. (d) (1)

No credit for explanation.

Question 11d

Suggest one reason for differences in undernourishment between countries.

There is no requirement to use Figure 11 though candidates may use it to inform their answer.

One mark for a basic statement, eg

- Some countries are landlocked. (1)
- Some countries are poorer than others. (1)
- Climate may make growing crops more difficult in some countries. (1)

Second mark must be a developed point for further clarity eg

- Some countries are landlocked eg Chad (1) which will make importing sufficient food more difficult. (d) (1)
- Some countries are poorer than others (1) so they will be less able to buy enough food. (d) (1)
- Climate may make growing crops more difficult in some countries (1) such as Sahelian countries where irregular rains limit crop production. (d) (1)

No credit for description of differences on the map.

Question 12a

Complete Figure 13 using the following data.

One mark for each correct choropleth completion, including correct use of key.

Question 12b

Describe the distribution of the countries which had a water footprint of 550–1000 m³ per person per year as shown in Figure 13.

Answers should make use of Figure 13 through naming countries and locations in order to describe the distribution.

One mark for a basic statement, eg

- The main area is in central Africa (accept central southern). (1)
- There is one isolated country in west Africa. (1)
- All but one are found in roughly the centre of the continent. (1)

Second mark may be a second separate point or developed point for further clarity eg

- The main area is in central Africa (accept central southern) (1) with just one other in the west. (d) (1)
- There is one isolated country in west Africa (1) with one other separate area in the centre of Africa. (d) (1)
- All but one are found in roughly the centre of the continent (1) and are in one contiguous area. (d) (1)

No credit for explanation.

Question 12c

Outline one way in which economic development leads to increased water consumption.

There is no requirement to use Figure 13 though candidates may use it to inform their answer.

One mark for a basic statement, eg

- Countries use more water as they industrialise. (1)
- The more energy consumed the more water used. (1)
- Increased living standards increase water use. (1)

Second mark must be a developed point for further clarity eg

- Countries use more water as they industrialise (1) because manufacturing industry uses more water. (d) (1)
- The more energy consumed the more water used (1) because it will be used in electricity plants for cooling. (d) (1)
- Increased living standards increase water use (1) because people can afford goods which use more water such as dishwashers. (d) (1)

No credit for description of differences on the map.

Question 12d

What is meant by water deficit?

When water demand exceeds supply / Not enough water to meet people's needs.

One mark for a correct statement with words to the effect above ie idea of shortage and needs not met.

Question 12e

Suggest how water supplies can be made more sustainable.

Use Figures 14a and 14b and your own understanding.

- **Level 3 responses (5-6 Marks)** will cover sustainable water supply practices in detail and link these to the examples provided by the figures through interpretation.

Indicative content

- Exact content will vary according to the water supply methods chosen but is likely to include:
- From the figures: grey water schemes and water harvesting.
- Grey water schemes use water again without treatment, this will reduce the need to abstract water and is also more sustainable by reducing the need to use energy in treatment.
- Water butts harvest rainwater that would otherwise simply be runoff / go into drains, thus reducing the need to use treated water from taps.
- Recycling water allows for 'dirty' water to be re-used after treatment which is more sustainable because less water needs to be extracted and less energy is used as it is usually used for irrigation and industrial uses which need lower levels of treatment and thus less energy consumption.
- Groundwater management involves careful monitoring so that it is not extracted faster than it can be replenished. Pollution is also controlled so that the clean supply lasts longer.

No credit for reduction of demand unless it is clearly linked to making supplies more sustainable:

Question 13a

Complete Figure 15 using the following data.

One mark for each correct choropleth completion, including correct use of key.

Question 13b

Describe the distribution of the countries which had 75–100% access to electricity as shown in Figure 15.

One mark for a basic statement, eg

- The main area is in North Africa / bordering the Mediterranean. (1)
- There are two isolated central African countries. (1)
- South Africa is an isolated example in the south. (1)

Second mark may be a second separate point or developed point for further clarity eg

- The main area is in North Africa / bordering the Mediterranean (1) with three further countries in the centre / south. (d) (1)
- There are two isolated central African countries (1) with only South Africa further to the south. (d) (1)
- South Africa is an isolated example in the south (1) with an area of three contiguous countries in the north west. (d) (1)

No credit for explanation.

Question 13c

Outline one way in which economic development leads to increased energy consumption.

There is no requirement to use Figure 15 though candidates may use it to inform their answer.

One mark for a basic statement, eg

- Countries use more energy as they industrialise. (1)
- The more goods consumed the more energy used. (1)
- Increased living standards increase energy use. (1)

Second mark must be a developed point for further clarity eg

- Countries use more energy as they industrialise (1) because manufacturing industry uses more energy. (d) (1)
- The more goods consumed the more energy used (1) because it will be used in manufacturing plants to produce the goods. (d) (1)
- Increased living standards increase energy use (1) because people can afford devices which use more energy such as computers. (d) (1)

No credit for description of differences on the map.

Question 13d

What is meant by energy deficit?

When energy demand exceeds supply / Not enough energy to meet people's needs.

One mark for a correct statement with words to the effect above ie idea of shortage and needs not met.

Question 13e

Suggest how energy use can be made more sustainable.

Use Figures 16a and 16b and your own understanding.

- **Level 3 responses(5-6 Marks)** will cover sustainable energy use practices in detail and link these to the examples provided by the figures through interpretation.

Indicative content

- Exact content will vary according to the methods chosen but is likely to include and must focus on demand reduction:
- From the figures: designing homes for sustainability and energy conservation and designing transport for sustainability.
- Insulating homes mean that less energy will be required for heating which is currently c.15% of the average UK person's carbon footprint.
- Replacing boilers for more efficient ones / switching to heat source pumps / low energy appliances will reduce home energy demand
- Workplaces and transport can be designed for sustainability such as the workplace charging point in the figure which encourages people to change to more sustainable transport methods.
- Transport can be more sustainable if it is more efficient such as lower fuel consumption, changing diesel trains for electric, using biofuel for buses.
- Individual energy use and carbon footprints can be more sustainable if people are educated about the impact their choices have and they switch to actions that reduce their energy use. Credit any reasonable discussion of changes individuals could make that will lead to demand reduction.
- Accept comments re legislation, eg the intention to ban all diesel and petrol cars in the UK by 2040.

No credit for description or discussion of sustainable energy generation.

Question 14a

Suggest how access to clean water may influence the differences in levels of well-being shown in Figure 9.

Credit any reasonable idea or explanation of the link.

Must make use of Figure 9 for any marks, this could be through naming places or inferred through use of the well-being scale.

Candidates should clarify how differences arise for both marks.

One mark for a basic statement, which might only explain one level of well-being, eg:

- Less clean water in Egypt leads to low well-being. (1)
- Young people in the UK have high well-being because clean water is always available. (1)
- Low well-being results from childhood illness from dirty water. (1)

Two marks for a development or alternative idea which focusses on the differences, eg:

- Less clean water in Egypt leads to lower well-being (1) than some African countries which might have better water supplies. (d)(1)
- Young people in the UK have high well-being because clean water is always available (1) and this is typical of Europe in being higher than Asian countries. (d) (1)
- Low well-being results from childhood illness from dirty water (1) as seen in Africa where well-being is always lower than HICs. (d)(1)

No credit for opposites.

Question 14b

Name one area in the UK that experiences water deficit.

Credit any reasonable expression of location that is in the south and east of the UK, eg:

South East, London, Thames / Anglian Water, Lincolnshire

Question 14c

There is a need to transfer water in the UK to maintain supplies.

Explain how changing demand for water increases this need.

Credit some basic recognition of the issue for an initial mark. For fuller marks the candidates need to connect the rising demand as being concentrated in areas of deficit, therefore increasing the need eg: The UK's population is growing which means more water is needed (1) much of this growth is in the south east (1) which means that there will be more unmet demand unless supplies are moved (1). Many people now have appliances which use water eg dishwashers (1) and these are more likely in the richer south east (1) so the demand in this area goes up when they have little water (1). Lots of new homes are being built in the south east (1) and London is expected to be more than 10 million by 2035 (1) so there will be more demand where there is already a deficit (1).

No credit for contradictory arguments.

Question 14d

'Growing concern in the UK about the carbon footprint of food creates both opportunities and challenges.'

Use evidence from Figure 10a and Figure 10b to explain this statement.

- **Level 3 (Marks 5-6)** responses will provide a considered understanding of both opportunities and challenges, supported with thorough use of the information.

Indicative content

- Figure 10a shows the carbon emissions from the production of different foods, with beef and lamb creating the highest amount of CO₂ emissions.
- Figure 10b shows a screenshot of a website of a not-for-profit organisation which sells and delivers a variety of foods from local producers.
- Candidates should show awareness of how increasing greenhouse gas emissions from production and transport of food, over increasing distances, is causing challenges.
- Credit any reasonable challenges. Challenges are likely to include:
 - The use of figure 10a to show the high levels of carbon emissions from meat production (particularly beef and lamb).
 - Food miles and the impact of transportation by plane or lorries.
 - Emissions created by methane from animals or the destruction of forests for grazing land.
- Candidates should show awareness of opportunities such as growing interest in buying more locally produced food with less environmental impact.
- Credit any reasonable opportunities, which may include:
 - The opportunity for alternative sources of food such as local suppliers/farmers markets, rather than supermarkets, to reduce emissions from transport.
 - The opportunity for producers to find ways of reducing the impact of food production – such as moving towards farming food types which cause lower carbon emissions.
- They may use figure 10b to suggest being able to have a variety of foods from different producers delivered in one order also helps to reduce transport emissions.
- Figure 10a/b should be used by reference to figures given or description that is accurate enough to infer use of the resource rather than learned knowledge.
- Credit challenges and opportunities that arise elsewhere in the world from the growing concern in the UK.

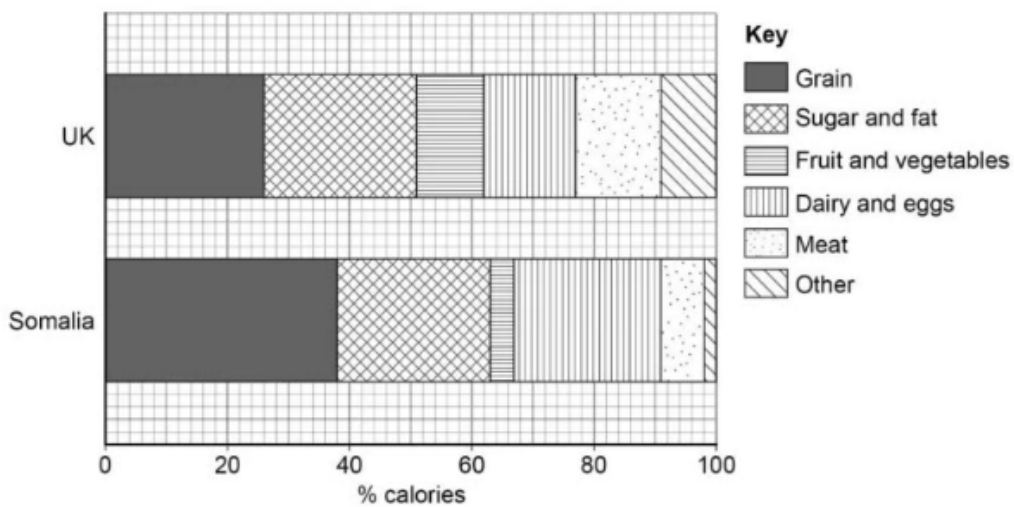
Question 15a

Complete Figure 11 using the following data for Somalia.

1+1

First mark for correct plotting of line, second for correct labelling/identification or suitable key.

Max one mark if the sections are plotted in the wrong order.



Question 15b

State two differences between the typical daily diet in the UK and Somalia shown in Figure 11.

Clear explicit differences from the graph are required. Must be differences not similarities.

Credit use of contrasting figures as an implicit difference.

Contrasts include

- The UK diet includes more meat (1)
- Somalia consumes 9% more dairy and eggs than the UK (1)
- The Somalian diet includes 38% grain. Whereas in contrast the UK diet has less with only 26% (1).

No double credit for opposite statements.

Question 15c

Outline one reason for differences in food supply between countries.

One mark for a basic statement, eg:

- Meat is an expensive food (1)
- The climate of a country affects the food that will grow there (1)
- Some countries import a lot of their food (1)

Two marks for a developed idea eg:

- Meat is an expensive food (1) which fewer people in LICs can afford (d) (1)
- The climate of a country affects the food that will grow there (1). For example the monsoon climate in India is good for growing rice (d) (1)
- Some countries import a lot of their food (1) which mean they can eat a more varied diet / food they can't grow themselves (d) (1)

Reasons given may consider quantity of food (calories consumed), quality or food types.

The specification states food supply may be affected by economic development, rising population, climate, technology, pests and disease, water stress, conflict and poverty. Credit any reasonable answer.

No credit for a description of the difference.

Answer does not need to make use of Figure 11 although it is possible students may use this as a stimulus.

Question 15d

What is meant by food insecurity?

One mark for correct answer, eg

Lack of food (1)

Not being able to access safe and nutritious food (1)

Question 15e

Suggest how food insecurity can have both economic and social impacts.

Use Figure 12a and Figure 12b and your own understanding.

- **Level 3 (Marks 5-6)** responses will cover the figure and either a named example or well developed geographical understanding and provide a considered interpretation of the link.

Indicative content

- The specification requires food security and its impacts to be studied and makes reference to the economic and social impacts of famine, undernutrition, rising prices and social unrest.
- The question does not specify so accept any economic or social impacts.
- There is no requirement to use a specific case study example or named place although candidates may well use examples to demonstrate their understanding.
- Answers should make use of figure 12a and/or 12b and appropriate geography, balance is not required.

- Reference to figures 12a/12b may be inferred even if not explicitly stated through such comments as: people are unhappy about rising food prices and gather to protest.
- The command 'suggest' requires a link to be established between food insecurity and economic and social impacts.
- No credit for environmental impacts unless developed and linked to economic or social impacts.
- Impacts may be positive as well as negative.
- Impacts are varied and any reasonable ones should be credited, likely impacts are:

Social

- × Famine which may cause death through starvation as well as malnutrition.
- × Illness and death caused by undernutrition (poor diet with vitamin and mineral deficiency).
- × There may be social unrest if some groups of people have more access to food than others.
- × Protests and rioting in anger against the government.
- × Standard of living may decline if more money is spent on food – at the expense of housing, healthcare and education.

Economic

- × Rising food prices make it harder to afford, especially hitting the poorest hard.
- × People suffering from malnutrition or undernutrition may lack the energy to work and therefore cannot earn money or farm for themselves.
- ✓ Farmers or people with access to food may benefit from being able to charge higher prices.

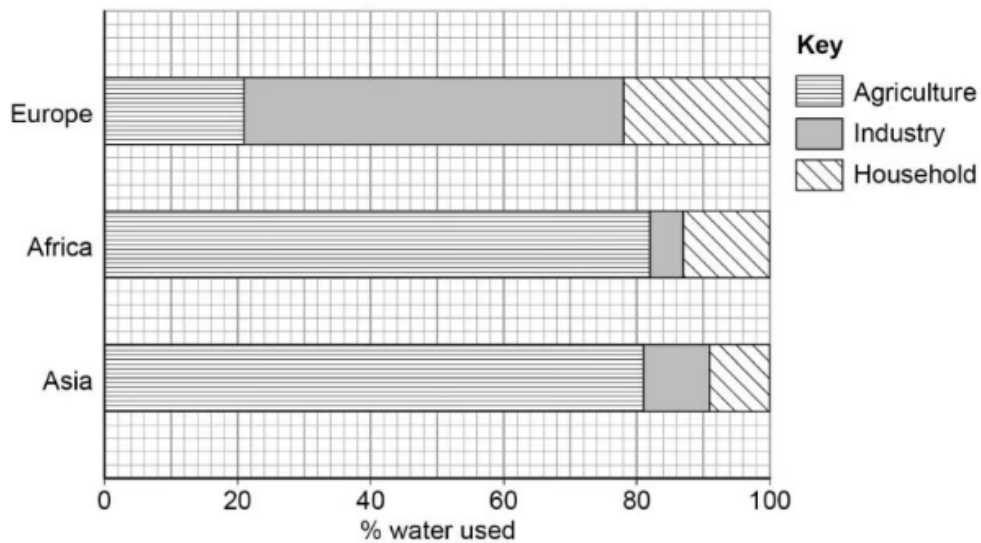
Question 16a

Complete Figure 13 using the following data for Asia.

1+1

First mark for correct plotting of line, second for correct labelling / identification or suitable key.

Max one mark if the sections are plotted in the wrong order.



Question 16b

State two differences between the water use in Europe and Africa shown in Figure 13.

Clear explicit differences from the graph are required. Must be differences not similarities.

Credit use of contrasting figures as an implicit difference.

Contrasts include:

- Africa uses more water in agriculture (1)
- In Europe industry consumes the most water, whereas in Africa agriculture is the largest section (1)
- Europe uses 22% of its water in households which is 9% greater than Africa (1).

No double credit for opposite statements.

Question 16c

Outline one reason for differences in water use between countries.

One mark for a basic statement, eg:

- Countries may have a large population (1)
- Many African countries have high temperatures (1)
- People in HICs can afford more appliances like washing machines (1)

Two marks for a developed idea eg:

- Countries may have a large population (1) who will use more water for drinking and washing (d) (1)
- Many African countries have high temperatures (1) so they need to use more water to help crops grow (d) (1)
- People in HICs can afford more appliances like washing machines (1) which need water to work (d) (1)

Reasons given may consider quantity of water consumed, quality or how the water is used.

The specification states water supply may be affected by economic development, rising population, climate, geology, pollution of supply, over-abstraction, limited infrastructure and poverty. Credit any reasonable answer.

No credit for a description of the difference.

Answer does not need to make use of figure 13 although it is possible students may use this as a stimulus.

Question 16d

What is meant by water insecurity?

One mark for correct answer, eg

Lack of water (1)

Not being able to access clean and safe water (1).

Question 16e

Suggest how water insecurity can have both economic and social impacts.

Use Figure 14a and Figure 14b and your own understanding.

- **Level 3 (Marks 5-6)** responses will cover the figure and either a named example or well developed geographical understanding and provide a considered interpretation of the link.

Indicative content

- The specification requires water security and its impacts to be studied and makes reference to the economic and social issues of waterborne disease, food production, industrial output, and potential for conflict.
- The question does not specify so accept any economic or social impacts.
- There is no requirement to use a specific case study example or named place although candidates may well use examples to demonstrate their understanding.
- Answers should make use of figure 14a and/or 14b and appropriate geography, balance is not required.
- Reference to figures 14a/14b may be inferred even if not explicitly stated through such comments as: people may have to spend their time trying to find supplies of water.
- The command 'suggest' requires a link to be established between water insecurity and economic and social impacts.
- No credit for environmental impacts unless developed and linked to economic or social impacts.
- Impacts may be positive as well as negative.
- Impacts are varied and any reasonable ones should be credited, likely impacts are:

Social

- × Where there are shortages of water people may be forced to drink polluted or untreated water.
- × Waterborne disease which may lead to serious illness and death.
- × Dehydration.
- × Shortage of food, if no water for irrigation, may also lead to illness and death.
- × There may be social unrest if some groups of people have more access to water than others.
- × Disagreements may occur between countries if they share a water supply and one country extracts unfair amounts or reduces the supply, such as by building a dam.
- × Higher food prices hit poor people disproportionately harder than others.

Economic

- × Time spent queuing for or travelling to collect water may reduce the time available to carry out paid work.
- × Unreliable or low supplies of water mean farmers struggle to grow crops, leading to lower income.
- × Less crops may lead to higher prices. × Water shortages lead to lower industrial production, which may lead to lower wages, job losses and slow economic development.
- × Illness may prevent people working and deaths of family members to waterborne disease may reduce the earning power of the family.
- ✓ Investment in infrastructure to ensure reliable supplies may create jobs.

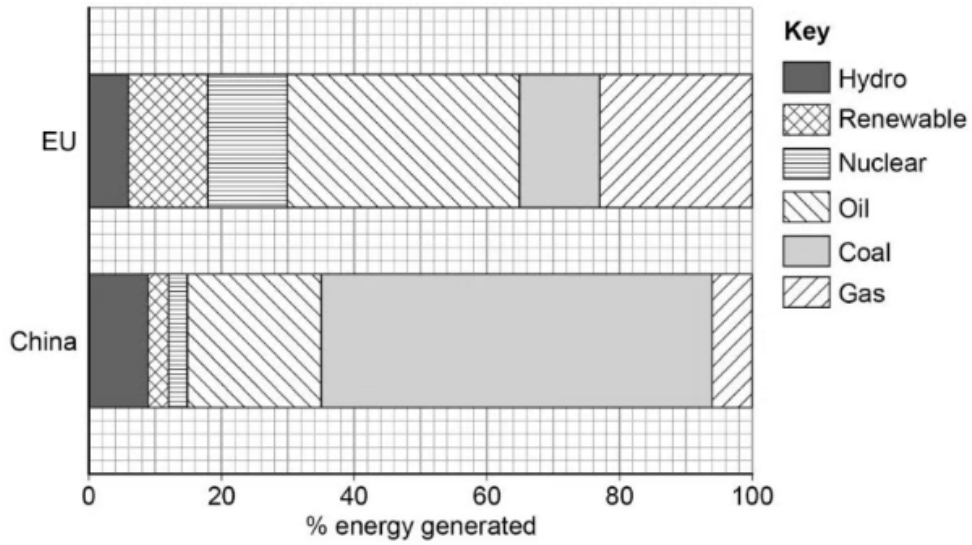
Question 17a

Complete Figure 15 using the following data for China.

1+1

First mark for correct plotting of line, second for correct labelling / identification or suitable key.

Max one mark if the sections are plotted in the wrong order.



Question 17b

State two differences between the energy mix in the EU and China shown in Figure 15.

Clear explicit differences from the graph are required. Must be differences not similarities.

Credit use of contrasting figures as an implicit difference.

Contrasts include:

- The EU uses more nuclear power (1)
- China uses nearly double the % amount of Hydro power than the EU. (1)
- China's largest segment is coal, whereas the EU's most popular energy source is oil. (1)

No double credit for opposite statements.

Question 17c

Outline one reason for differences in energy use between countries.

One mark for a basic statement, eg:

- Some countries like China have large supplies of coal (1)
- HICs and NEEs have more factories (1)
- Some governments invest more money in renewable energy (1)

Two marks for a developed idea eg:

- Some countries like China have large supplies of coal (1) so it is cheaper to use that rather than oil (d) (1)
- HICs and NEEs have more factories (1) which use energy in the production process (d) (1)
- Some governments invest more money in renewable energy (1) making it more likely they will get their energy from solar or wind power (d) (1)

Reasons given may consider quantity of energy consumed, the energy sources used or how the energy is used.

The specification states energy supply may be affected by economic development, rising population, technology, physical factors, cost of exploitation, and production and political factors. Credit any reasonable answer.

No credit for a description of the difference.

Answer does not need to make use of figure 15 although it is possible students may use this as a stimulus.

Question 17d

What is meant by energy insecurity?

One mark for correct answer, eg

Lack of energy (1)

Not being able to access affordable and reliable energy supplies (1)

Question 17e

Suggest how energy insecurity can have both economic and environmental impacts.

Use Figure 16a and Figure 16b and your own understanding.

- **Level 3 (Marks 5-6)** responses will cover the figure and either a named example or well developed geographical understanding and provide a considered interpretation of the link.

Indicative content

- The specification requires energy security and its impacts to be studied and makes reference to the economic and environmental impacts of exploration of difficult and environmentally sensitive areas, economic and environmental costs, food production and industrial output.
- The question does not specify so accept any economic or environmental impacts.
- There is no requirement to use a specific case study example or named place although candidates may well use examples to demonstrate their understanding.
- Answers should make use of figure 16a and/or 16b and appropriate geography, balance is not required.
- Reference to figures 16a and 16b may be inferred even if not explicitly stated through such comments as: oil can wash up on beaches damaging habitats.
- The command 'suggest' requires a link to be established between energy insecurity and economic and environmental impacts.
- No credit for social impacts unless developed and linked to economic or environmental impacts.
- Impacts may be positive as well as negative.
- Impacts are varied and any reasonable ones should be credited, likely impacts are:

Economic

- × The price of energy may rise.
- × Countries that must rely on importing fuel are reliant and more vulnerable to price increases.
- × Extracting energy sources from more remote areas is more expensive and requires more expensive equipment.
- × People may have to spend time walking a large distance to collect firewood as their main energy source rather than using that time to grow food or for paid work.
- × Energy shortages and higher economic costs lead to lower industrial production, which may lead to lower wages, job losses and slow economic development.
- × Companies may leave and go to a country with more reliable and cheaper energy supplies, leading to job losses.
- × Growing biofuels rather than agricultural produce increases the price of food and can reduce the income made exporting food.
- ✓ Some farmers may earn more money growing biofuels.
- ✓ New jobs may be created in energy companies as countries invest in renewable energy.
- ✓ Jobs may be created in areas with limited opportunities.

Environmental

- × Countries may need to explore and use environmentally sensitive areas to access energy supplies.
- × Fragile environments are put at risk and can be damaged, such as the Arctic and the Amazon Rainforest.
- × The transportation of energy resources, such as oil, can lead to spillages on land and sea, causing catastrophic damage to wildlife.
- × Air pollution from fossil fuel power stations.
- ✓ People may use energy more wisely as prices increase, which reduces emissions.

Question 18

'There are economic and environmental issues associated with the exploitation of energy sources.'
Use evidence from Figure 10a and Figure 10b to explain this statement.

- **Level 3 responses(5-6 Marks)** will provide a considered understanding of both economic and environmental issues, supported with thorough use of the information.

Indicative content

- Figure 10a shows the relative costs of different energy sources with onshore wind the cheapest by some margin.
- Figure 10b shows the landscape impact on and offshore and an opinion on wind turbines.
- Candidates should be showing awareness of how these relative costs and impacts will present issues for the UK.
- Figure 10a/b should be used by reference to figures given or description that is accurate enough to infer use of the resource rather than learned knowledge.
- Candidates might realise that there is a dilemma between the cheapest source provoking some strong feelings by those who feel it has a negative impact on landscape quality and the more acceptable version being little cheaper than fossil fuels.
- They may show some understanding of the environmental costs of using coal and gas to produce electricity caused by emitting greenhouse gases and contributing to climate change.
- They may make comments on coal and gas now having greater economic costs, as well as environmental costs.
- Comparisons might be made with the damage to the landscape done by coal and gas fired power stations and the wind turbine shown.
- They may recognise that fossil fuels cost little more than offshore wind but have a finite lifespan and will probably only get more expensive as supplies dwindle.
- Wind power on the other hand is likely to become cheaper over time and will have a relative advantage as fossil fuel costs go up.

Question 19

Suggest how food supplies can be made more sustainable.

Use Figures 12a and 12b and your own understanding.

- **Level 3 responses(5-6 Marks)** will cover sustainable farming and food supply practices in detail and link these to the examples provided by the figures through interpretation.

Indicative content

- Exact content will vary according to the farming methods chosen but is likely to include:
- From the figures: urban farming schemes and sustainable fishing.
- Urban farming on rooftops, balconies, allotments and otherwise unused plots makes food locally available and with a lower carbon footprint. It can also be fresher and more nutritious and improve food security for poorer residents.
- Fish from sustainable sources will help combat over-fishing so that stocks can replenish and therefore be available into the future.
- Grass fed beef is much more sustainable than that which is farmed indoors, fed on grain or on cleared forest, due to replenishing the soil with manure and being much less carbon-intensive.
- Seasonal food consumption reduces the need for imports which can have a higher carbon footprint. Accept the assertion that imported food has a higher footprint though this is not always the case.
- Reduced waste and losses will make food more sustainable by making existing supplies last longer and reducing amounts into landfill which produces methane.
- Credit reference to small scale schemes in LIC/NEEs such as rice-fish in Bangladesh and agroforestry in Mali.