GEO.HU8 Global Food Security: Supply, Insecurity and Increasing Production

Total Marks

AQA 8035 · Calculators not allowed · about 50 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Define the term food security, as used in global food supply discussions.

(Total for Question 1 is 1 mark)

2 Define the term food insecurity in a global context.

(Total for Question 2 is 1 mark)

3 Give one physical factor that can reduce food supply globally.

(Total for Question 3 is 1 mark)

4 Give one human factor that can reduce food supply in an area.

(Total for Question 4 is 1 mark)

5 The table below shows average daily calorie intake per person in three country groups, and the percentage of the population classified as undernourished, for a hypothetical global snapshot year.

Group	Average calories per person per day	Undernourished population (%)
High income countries (HICs)	3,400	2
Newly emerging economies (NEEs)	2,900	8
Low income countries (LICs)	2,100	22
World average	2,750	12

Using the table, describe the pattern shown by the data in terms of calorie intake and undernourishment across the three country groups.

(Total for Question 5 is 3 marks)

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6 Using the table in Question 5, calculate the absolute difference in average daily calorie intake between HICs and LICs. Show your working.

(Total for Question 6 is 2 marks)

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7 State which country group in the table from Question 5 has undernourishment closest to the world average, and give the two percentages.

(Total for Question 7 is 1 mark)

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8 Give two examples of technological strategies that can increase food production without naming a specific project.

(Total for Question 8 is 2 marks)

9 Name one water-related agricultural strategy used to increase food supply and one biological strategy, without naming a specific scheme or company.

(Total for Question 9 is 2 marks)

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10 Explain TWO ways in which pests and crop disease can reduce food supply. Each way should include a linked effect.

(Total for Question 10 is 6 marks)

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11 Give one social consequence of food insecurity for children in low income countries.

(Total for Question 11 is 1 mark)

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12 Suggest two human causes that can contribute to food insecurity at a national scale.

(Total for Question 12 is 2 marks)

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13 Explain one advantage and one disadvantage of using irrigation to increase food production, without naming a specific irrigation scheme.

(Total for Question 13 is 2 marks)

14 Give one way that increasing food production through technology could reduce the environmental impact compared with expanding farmland area.

(Total for Question 14 is 1 mark)

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15 Use your knowledge of global patterns, physical and human factors, and strategies to increase production to answer this question.

Explain the causes of global food insecurity.

(Total for Question 15 is 12 marks)

Mark scheme · GEO.HU8 Global Food Security: Supply, Insecurity and Increasing Production

Question 1

- **B1** secure access by all people at all times to sufficient, safe and nutritious food for an active and healthy life, oe
- **Answer: Secure access by all people at all times to sufficient, safe and nutritious food for an active and healthy life.**

Question 2

- **B1** when people do not have reliable access to enough affordable, safe or nutritious food to meet dietary needs and lead a healthy life, oe
- **Answer: When people do not have reliable access to enough affordable, safe or nutritious food to meet dietary needs and lead a healthy life.**

Question 3

- **B1** for example, drought or unreliable rainfall reducing crop yields, oe
- **Answer: Drought or unreliable rainfall reducing crop yields.**

Question 4

- **B1** for example, conflict disrupting food production and distribution, oe
- **Answer: Conflict disrupting food production and distribution.**

Question 5

- **B1** HICs have the highest average calorie intake (3,400) and the lowest undernourished percentage (2%), oe
- **B1** NEEs are intermediate with 2,900 calories and 8% undernourished, whereas LICs have the lowest calorie intake (2,100) and highest undernourishment (22%), oe
- **B1** overall pattern shows higher calorie intake is associated with lower undernourishment across these groups, oe
- **Answer: HICs have the highest average calorie intake (3,400) and the lowest undernourishment (2%). NEEs are intermediate (2,900 calories and 8% undernourished). LICs have the lowest intake (2,100) and highest undernourishment (22%). Overall, higher calorie intake is associated with lower undernourishment across the groups.**

Question 6

- **M1** 3400 - 2100 seen, oe
- **A1** 1300 calories per person per day cao
- **Answer: 1,300 calories per person per day.**

Question 7

- **B1** NEEs; 8% compared with world average 12%, oe
- **Answer: NEEs; 8% undernourished compared with the world average of 12%.**

Question 8

- **B1** for example, hydroponics or aeroponics, oe
- **B1** for example, genetically modified crops designed for higher yields or pest resistance, oe
- **Answer: Hydroponics or aeroponics; genetically modified crops designed for higher yields or pest resistance.**

Question 9

- **B1** irrigation, oe
- **B1** biotechnology such as crop breeding or tissue culture, oe
- **Answer: Irrigation; biotechnology such as crop breeding or tissue culture.**

Question 10

- **B1** way 1 identified, e.g. pests eat crops or stored grain, reducing harvestable food, oe
- **B1** linked detail for way 1, e.g. loss of crop reduces farmers income and decreases market supply, leading to higher prices and increased food insecurity, oe
- **B1** way 2 identified, e.g. crop disease reduces plant health and yields, oe
- **B1** linked detail for way 2, e.g. disease can spread quickly and destroy large areas of crops, requiring replanting or imports, which delays supply and raises costs, oe
- **B1** additional valid linked effect, e.g. reduced yields can force farmers to use more chemical controls or abandon land, harming long term productivity, oe
- **B1** additional valid linked effect showing wider impact, e.g. reductions in supply increase vulnerability for poorer households who cannot afford price rises, oe
- **Answer: Pests eat crops or stored grain, directly reducing harvest and farmers income; this lowers market supply, pushes prices up and increases food insecurity for poorer households. Crop diseases reduce plant health and yields and can spread rapidly across fields, destroying large areas and forcing replanting or imports, which delays supply and raises costs, worsening access to food.**

Question 11

- **B1** for example, stunted growth or impaired cognitive development, oe
- **Answer: Stunted growth or impaired cognitive development.**

Question 12

- **B1** for example, conflict disrupting farming and distribution networks, oe
- **B1** for example, poverty limiting farmers access to inputs and markets, oe
- **Answer: Conflict disrupting farming and distribution; poverty limiting farmers access to inputs and markets.**

Question 13

- **B1** advantage, e.g. irrigation increases water availability so yields can rise and multiple crops per year are possible, oe
- **B1** disadvantage, e.g. overuse or poor management can cause salinisation or water depletion, reducing long term productivity, oe
- **Answer: Advantage: irrigation increases water availability and can raise yields or allow multiple crops per year. Disadvantage: overuse or poor management can cause salinisation or depletion of water resources, harming long term productivity.**

Question 14

- **B1** for example, vertical farming or hydroponics produces more yield per unit area, reducing the need to clear natural habitats, oe
- **Answer: Hydroponics or vertical farming produces higher yield per unit area, reducing the need to clear natural habitats for more farmland.**

Question 15

- **Level 3** (7-9): Detailed and well exemplified explanation that integrates a range of physical and human causes, shows how they interact to produce food insecurity, and refers to global patterning between HICs, NEEs and LICs.
- **Level 2** (4-6): Clear explanation of several causes, with explanation of impacts and some links between causes, but less detailed exemplification or limited reference to global patterns.
- **Level 1** (1-3): Basic statements of causes with limited explanation and little or no linkage between causes.
- **Indicative content:**
  - Physical causes: climate variability and extreme weather such as drought or floods reduce crop yields; variable soil quality and pests or crop diseases lower productivity.
  - Water-related limits: unreliable rainfall and water stress reduce irrigation potential and crop reliability in some regions, contributing to lower production in LICs and some NEEs.
  - Human causes: conflict disrupts farming, labour and supply chains, often leading to immediate shortages and long term abandonment of productive land.
  - Economic causes: poverty limits farmers access to inputs such as fertiliser, quality seed, machinery and finance, preventing yield improvements and market participation.
  - Market and trade causes: dependence on food imports or volatile global commodity prices can make food unaffordable when prices spike, especially in import-dependent LICs.
  - Population and demand: rapid population growth and dietary shifts in NEEs increase demand faster than supply can adjust, putting pressure on global availability and local access.
  - Infrastructure and governance: poor transport, storage and market infrastructure cause post-harvest losses and unequal distribution; weak governance and lack of safety nets increase vulnerability.
  - Interactions and patterns: many LICs face combinations of physical vulnerability and poverty, explaining global patterns of low calorie intake and high undernourishment compared with HICs; NEEs show mixed outcomes depending on investment and technology adoption.
  - Strategies and limitations: technological solutions such as irrigation, biotechnology, hydroponics and appropriate technology can raise production, but they require investment, training and often reliable water or energy, so they may not immediately solve insecurity where poverty or conflict persist.
  - A high-quality answer will link causes together, for example showing how climate shocks amplify poverty and market failure, and conclude with an overall judgement on the relative importance of the listed causes in producing global food insecurity.