



GEO.KS39 Food Security: Rising Demand and Factors Affecting Supply

AQA 8035 · Calculators not allowed · about 35 minutes

Total Marks

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Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Define the term 'food security' as used in discussions of national and global supply and demand.

(Total for Question 1 is 1 mark)

- 2** State ONE demographic reason why global demand for food has increased in recent decades, naming the demographic factor and the direction of change.

(Total for Question 2 is 1 mark)

- 3** State ONE way rising incomes in newly emerging economies can change patterns of food demand.

(Total for Question 3 is 1 mark)

- 4** Describe the pattern shown by the following simplified data for average daily calorie intake per person in four world regions in 2010 and 2020. Data in kilocalories per person per day: Region A: 2010 = 2,400; 2020 = 2,650. Region B: 2010 = 3,100; 2020 = 3,050. Region C: 2010 = 2,100; 2020 = 2,450. Region D: 2010 = 2,800; 2020 = 2,900.

(Total for Question 4 is 4 marks)

- 5** Suggest TWO reasons, linked to diet change and income, why calorie intake rose most in Region C between 2010 and 2020 in the data provided in Question 4.

(Total for Question 5 is 3 marks)

- 6** Explain TWO ways that drought and unreliable rainfall can reduce food supply in a farming region.

(Total for Question 6 is 4 marks)

- 7** Explain TWO ways pests and disease affecting crops or livestock can limit food supply for a region or country.

(Total for Question 7 is 4 marks)

- 8** Suggest TWO ways limited access to agricultural technology, such as machinery, fertiliser and irrigation, can reduce food supply in lower-income farming systems.

(Total for Question 8 is 4 marks)

- 9** The map below shows a simplified, hypothetical pattern of average annual cereal production per person in four neighbouring countries in tonnes per person per year: Country W = 0.12; Country X = 0.45; Country Y = 0.08; Country Z = 0.30. Using these figures, calculate the average cereal production per person for the four-country area combined. Show your working and give the answer to two decimal places.

(Total for Question 9 is 4 marks)

Mark scheme · GEO.KS39 Food Security: Rising Demand and Factors Affecting Supply

Question 1

- **B1** a state when all people, at all times, have physical and economic access to enough safe and nutritious food for an active and healthy life, oe
- **Answer: Food security is when all people, at all times, have physical and economic access to enough safe and nutritious food for an active and healthy life.**

Question 2

- **B1** population growth, oe
- **Answer: Population growth.**

Question 3

- **B1** increased demand for meat and dairy products as diets become richer, oe
- **Answer: Higher incomes often lead to increased demand for meat and dairy products.**

Question 4

- **B1** overall increases in calorie intake in Regions A, C and D between 2010 and 2020, oe
- **B1** Region B shows a slight decrease from 3,100 to 3,050, oe
- **B1** give values to support statements, e.g. Region C +350 kcal, Region A +250 kcal, Region D +100 kcal, Region B -50 kcal, oe
- **B1** make a conclusion about the pattern, e.g. Region C shows the largest absolute rise while Region B fell slightly, oe
- **Answer: Between 2010 and 2020, Regions A, C and D increased their average calorie intake while Region B fell slightly. Region C shows the largest absolute rise (+350 kcal), Region A rose by 250 kcal, Region D by 100 kcal and Region B fell by 50 kcal.**

Question 5

- **B1** rising incomes in Region C allowing households to buy more food, oe
- **B1** a shift towards more meat and processed foods that are higher in calories as diets westernise, oe
- **B1** greater access to cheap, energy-dense foods through supermarkets and supply chains, oe
- **Answer: Possible reasons include rising incomes in Region C allowing households to buy more food, a shift towards more meat and processed foods that are higher in calories as diets westernise, and greater access to cheap, energy-dense foods through expanding supermarkets and supply chains.**

Question 6

- **B1** drought reduces soil moisture which directly lowers crop growth and yields, oe
- **B1** linked detail for drought, e.g. crops may die or fail to produce a harvest, reducing total food available, oe
- **B1** unreliable rainfall causes planting and harvest timing to be uncertain, leading to higher crop losses and lower productivity, oe
- **B1** linked detail for unreliable rainfall, e.g. it prevents predictable irrigation scheduling and can reduce multiple cropping cycles per year, lowering annual food supply, oe
- **Answer: Drought reduces soil moisture and crop growth so yields fall or crops fail; unreliable rainfall makes planting and harvest timing uncertain, increasing crop losses and preventing reliable irrigation and multiple cropping, so annual food supply is reduced.**

Question 7

- **B1** pests and crop disease can directly destroy or damage crops, reducing harvest volumes, oe
- **B1** linked detail, e.g. infestations or blight reduce marketable yield and force farmers to discard infected produce, lowering food supply, oe
- **B1** livestock disease reduces meat, milk and egg production and may require culling, which cuts available animal-source foods, oe
- **B1** linked detail, e.g. animal disease can also reduce farmer incomes so less is invested in next season's production, creating longer term supply reductions, oe
- **Answer: Pests and crop diseases damage and destroy crops, reducing harvest volumes and causing farmers to discard infected produce; livestock disease reduces meat, milk and egg production and can require culling, and reduced farmer incomes after outbreaks can limit investment in future production.**

Question 8

- **B1** lack of machinery limits the area that can be cultivated and makes planting and harvesting slower and less efficient, oe
- **B1** linked detail, e.g. without mechanisation yields per farmer remain low and post-harvest losses can be higher, reducing total supply, oe
- **B1** limited access to fertiliser reduces soil fertility and lowers yields, oe
- **B1** limited irrigation means crops are vulnerable to dry spells and cannot achieve higher-intensity or multiple cropping, lowering annual production, oe
- **Answer: Without machinery, less land is cultivated and harvesting is less efficient causing lower output and higher post-harvest loss; without fertiliser soil fertility and yields stay low; and without irrigation crops are vulnerable to dry spells and cannot be grown more intensively or in multiple cycles, all reducing food supply.**

Question 9

- **M1** evidence of adding the four values and dividing by 4, e.g. $(0.12 + 0.45 + 0.08 + 0.30) / 4$ seen, oe
- **A1** 0.24 tonnes per person per year cao
- **B1** working shown with calculation to two decimal places, e.g. $0.95 / 4 = 0.2375$ rounded to 0.24 or 0.24 noted as incorrect rounding if 0.24 is given without correct method, oe
- **B1** correct rounding explicitly to two decimal places, 0.24, oe
- **Answer: Total = $0.12 + 0.45 + 0.08 + 0.30 = 0.95$. Average = $0.95 / 4 = 0.2375$, rounded to two decimal places = 0.24 tonnes per person per year.**