Factors affecting food security

4.7.5.1 · Ecology · revision notes

Food security means having enough food to feed a population. You need to describe the biological factors that threaten it and why sustainable ways of producing food are needed. This subtopic is in GCSE Biology only, not Combined Science.

Key facts

- Food security = having enough food to feed a population
- Threat: changing diets in developed countries (scarce food transported around the world)
- Threat: environmental change (e.g. rains failing → famine)
- Sustainable methods are needed to feed everyone
- Threat: increasing birth rate
- Threat: new pests and pathogens
- Threats: cost of agricultural inputs; conflicts affecting water or food

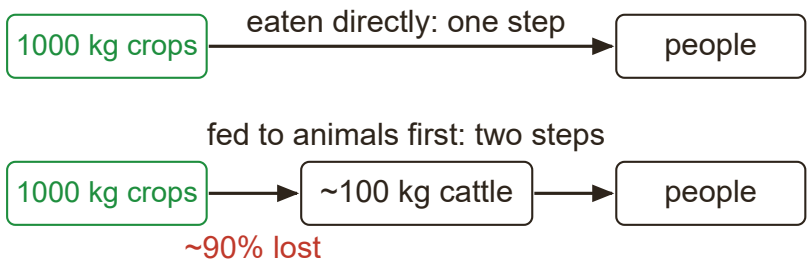
Notes

What food security means

- **Food security** means having enough food to feed a population.
- The human population is growing, so more food is needed. Ways of producing food sustainably are needed so that everyone on Earth can be fed.

Biological factors that threaten food security

- **Increasing birth rate**: in some countries the population is growing faster than food production can keep up.
- **Changing diets** in developed countries: demand for a wider range of foods means that scarce foods are shipped around the world, away from the people who grow them.
- Eating more meat also needs more land and crops, because biomass is lost when crops are fed to animals.



Feeding crops to animals first loses most of the biomass, so a meat diet needs more land.

- **New pests and pathogens** that affect farming: they can destroy crops or kill farm animals.
- **Environmental changes** that affect farming: e.g. if the rains fail, crops die and there can be widespread famine.
- **The cost of agricultural inputs**, such as fertiliser, pesticides, animal feed and fuel: farmers who cannot afford them produce less.
- **Conflicts**: wars can cut off supplies of water or food.

Why sustainability matters

- Sustainable food production can continue in the long term without using up resources or damaging the environment.
- Examples include sustainable fishing and using biotechnology to produce more food from less land.
- Threats often combine: a drought together with a conflict can leave a region without enough food.
- To judge food security from statistics, compare the rise in population with the rise in food production, e.g. food per person = food produced ÷ population.

How to answer each type of question

Define food security

1 mark | Grade 3

1. Use the phrase 'having enough food to feed a population'.
2. Do not confuse it with food safety (food being safe to eat).

Example. What is meant by **food security**?

Model answer. Having enough food to feed a population (1).

Describe factors that threaten food security

2 to 4 marks | Grade 4

1. Pick factors from the specification list.
2. For each one, say how it reduces the food available or increases the food needed.
3. Use the context in the question, e.g. a country with a fast-growing population.

Example. Describe **two** biological factors that could reduce food security in a country. (2 marks)

Model answer. Any two, each with how it reduces food security: a new pest or pathogen destroys crops or kills livestock (1); the rains fail, so crops do not grow and there may be famine (1); the birth rate increases, so more food is needed than is produced (1); conflict reduces the availability of water or food (1).

Explain the effect of a factor using data

3 marks | Grade 6

1. Describe what the data shows, with numbers.
2. Link the factor to food production or to the demand for food.
3. Conclude whether food security increases or decreases.

Example. In one country the population rose from 40 million to 52 million in 10 years. Wheat production stayed at about 8 million tonnes per year.
Explain how this affects food security in the country.

Model answer. The population increased by 12 million / 30% (1), but wheat production did not increase (1). So there is less wheat per person and food security decreases, unless food is imported (1).

Explain why sustainable methods are needed

2 marks | Grade 7

1. Say that the population is growing, so the demand for food keeps rising.
2. Say that unsustainable methods (e.g. overfishing, deforestation) use up resources or damage the environment, reducing future food production.

Example. Suggest why food must be produced sustainably.

Model answer. The human population is growing, so more food will be needed in future (1). Unsustainable methods, such as overfishing, use up resources or damage the environment, so less food could be produced in future (1).

Don’t lose marks

- Writing just 'food is too expensive'. Name the factor and its effect, e.g. fertiliser and animal feed cost too much, so farmers produce less food.
- Confusing food security with food safety or hygiene.

- Listing factors without explaining how each reduces the food available or increases the food needed.

More tips

Memory tricks

- Six threats: 'Big Diets Put Even Cheap Crops at risk' = Birth rate, Diets, Pests and pathogens, Environmental change, Cost of inputs, Conflict.
- Food security has two sides: supply (how much is produced) and demand (how many people, and what they eat).

Exam technique

- Link each factor to less food produced or more food needed.
- Use the factors in the specification; they are what mark schemes credit.
- In data questions, compare population growth with food production using numbers.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3

Define food security

Having enough food to feed a population.

Grade 4

List factors that threaten food security

Rising birth rate, changing diets, new pests and pathogens, environmental change, the cost of agricultural inputs and conflicts.

Grade 5

Explain how pests and pathogens threaten food supplies

They destroy crops or kill farm animals, so less food is produced.

Grade 6

Explain how environmental change affects food production

If the rains fail or temperatures change, crops fail, which can lead to famine.

Grade 7

Explain why sustainable food production is needed

Food must be produced without using up resources or damaging the environment, so that everyone can be fed in future.

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