

NAME: _____

Y13 Holiday Homework – Population and the Environment

- 1) Revise content (use your revision guide, textbook, YouTube videos, flashcards etc)
- 2) Test yourself by completing exam questions closed book
- 3) Check your answer using the mark scheme/textbook and green pen improve your answer so you get full marks.

1.

Outline reasons why salinisation of soil occurs.

[4 marks]

Q2.

Outline characteristics of an agricultural system.

[4 marks]

Q3.

Outline why salinisation is a problem for agriculture.

[4 marks]

Q4.

The picture below is a newspaper article from The Guardian which discusses food security issues in Ghana.

Ghana hopes G8 New Alliance will end long history of food insecurity



Despite Ghana's large tracts of fertile land, the west African country has a long history of food insecurity. Millions in the south are no longer at risk, but the number of vulnerable people in the more arid north has increased in recent years.

The government says that is why Ghana has signed up to the G8 New Alliance for Food Security and Nutrition in 2012. Under the initiative, the country will focus on five crops: cowpea, maize, cassava, rice and yam.

"This is really about improving the environment of aid effectiveness, food and nutrition so that countries can really take ownership of their food security and initiatives," said the Deputy Food and Agriculture Minister. "Ghana has huge potential in horticultural crops, in vegetables and fruits like pineapple. But natural resources by themselves do not bring economic returns. What is needed is more investment. There are better seeds than we are using, high-yield hybrid seeds that can double or triple harvests."

There was, however, almost no knowledge of the G8 initiative among some stakeholders, including farmers and agricultural campaign groups contacted by The Guardian. The government admits that it could have done more to consult those involved in the agricultural sector before signing up to the plan.

Confusion surrounding the plans is made worse, critics say, by a dizzying array of regional and national agriculture programmes that are inaccessible to ordinary people. All the initiatives involve providing more incentives for the private sector to buy and cultivate land, and to become involved in the country's seed industry. But there has been growing concern in Ghana that the commercialisation of the food industry will not benefit small farmers.

A spokesperson from the University of Ghana's agriculture college said "For the peasant farmers in Ghana, land is life. If multinational producers are given the ability to buy large quantities of land, then naturally the farmers who depend on those facilities may be deprived of their livelihood. And so most people would have serious concerns about that."

Using the information above and your own knowledge, evaluate strategies used to ensure food security.

[9 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Q5.

Assess the relative importance of two zonal soils you have studied in determining human activity such as agriculture.

[9 marks]

[illegible]

Q6.

Figure 1, Figure 2, Figure 3 and Figure 4 show information about some physical characteristics and agricultural production in Almeria, southern Spain.

Figure 1 The landscape and soil of Almeria



© Harek Stepan/Alamy stock photo

Figure 2 Climate graph for Almeria

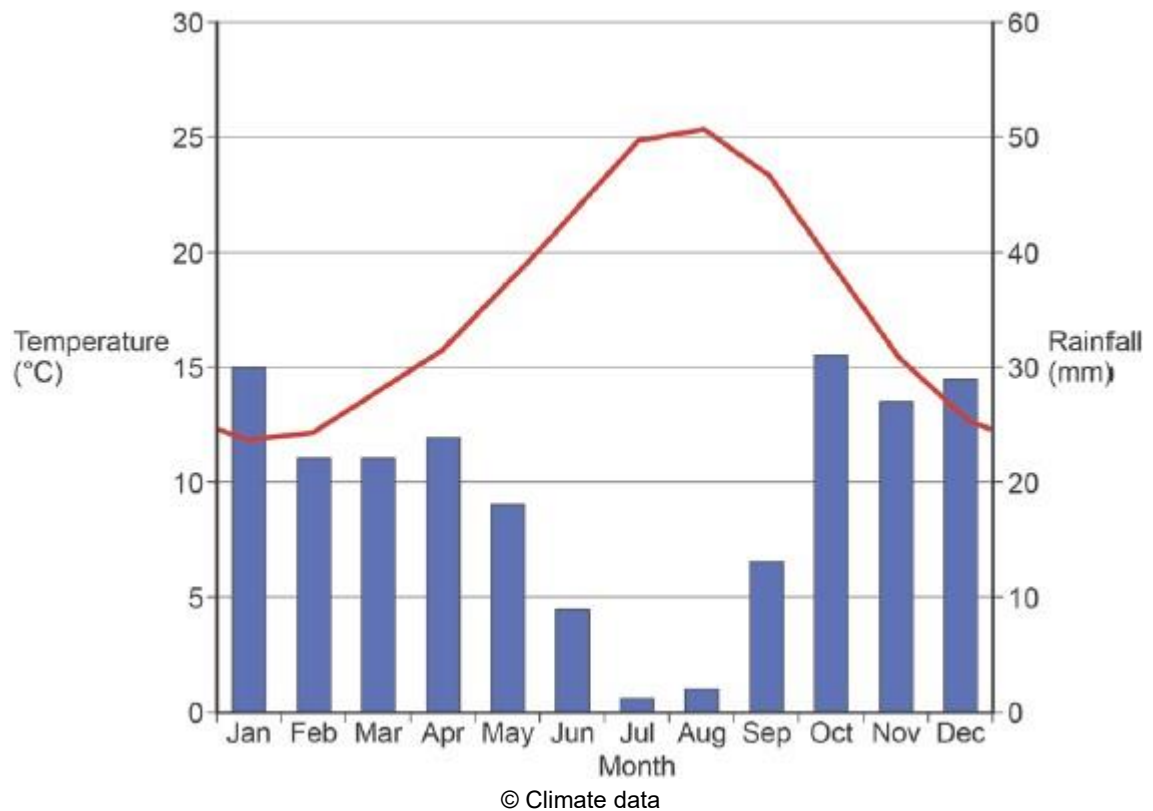


Figure 3 The export value of selected crops in Almeria

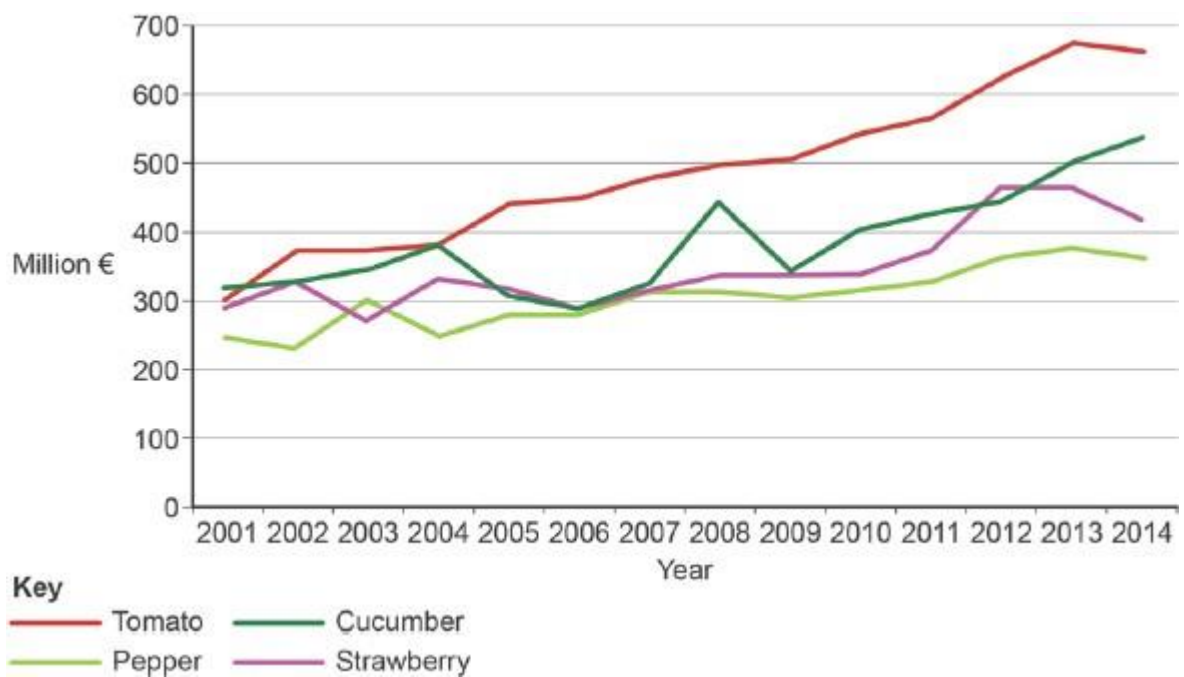


Figure 4 Plastic greenhouses in Almeria

Q7.

[9 marks]

Q8.

[9 marks]

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This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Q9.

Assess the extent to which current strategies to ensure food security support a positive perspective on future population growth.

[20 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Q10.

To what extent do you agree with this statement?

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[illegible]

Mark schemes

Q1.

Point marked

Allow 1 mark per valid point with extra mark(s) for developed points (d). For example:

Notes for answers

Allow credit for specific knowledge and understanding of the process of salinisation and the conditions leading up to it. For maximum marks there must be more than one reason.

- Salinisation means the accumulation of salts in soil and it can happen as a result of both natural and human processes (1).
- Over long periods of time, soil minerals are weathered and subsequently release salts (1). Salts are also added via dust and precipitation (d)(1).
- In areas of high temperatures and low precipitation salinisation occurs naturally due to high levels of evaporation (1). As water is drawn up through the soil it leaves behind any salts that were dissolved within it (d)(1).
- Human causes include excessive groundwater extraction which can lead to saltwater intrusion, whereby seawater is moved into freshwater supplies (1).
- Irrigation can also lead to salinisation where waterlogging causes the water table to rise bringing dissolved salts to the surface (1). Evaporation then leaves a crusty layer of concentrated salts on the surface (d)(1).

The Notes for answers are not exhaustive. Credit any valid points.

AO1 = 4

[Total 4 marks]

Q2.

Point marked

If more than one agricultural system chosen, credit the best response. Allow 1 mark per valid point with extra mark(s) for developed points (d). Credit examples where appropriate. For example:

Notes for answers

- Agricultural systems are characterised by the application of human inputs such as labour and capital to natural factors and elements such as climate and soil (1). Processes convert the inputs into outputs and include cultivation and harvesting, animal husbandry and livestock management (1). Outputs such as food and raw material crop and animal products (1). Such systems are particularly sensitive to environmental factors and relatively prone to the impact of natural environmental hazards, resulting in losses from the system (1) (d).
- Intensive farming has large amounts of human inputs such as labour and / or capital (1). They have high levels of productivity from relatively small plots (1) (d).
- Hill-sheep farming is an example of an extensive pastoral agricultural system (1) where there are low inputs of labour and machinery but large inputs of an extensive upland area (1) (d). Yields are low in relation to the area of land used (1).
- In Almeria, there are large human inputs in the form of labour, greenhouses and fertilisers (1). This means there is large capital investment with many farms being owned by co-operatives (1) (d). Due to the greenhouses, the process of growing fruit and vegetables can take place year-round (1). The system is prone to losses due to natural weather hazards, for example in 2018 many greenhouses were destroyed by severe gales (1) (d).

- Subsistence farming is when produce is grown for personal or community consumption (1). This system is most commonly found in LICs and is particularly prone to losses due to natural hazards such as drought (1) (dp).

The Notes for answers are not exhaustive. Credit any valid points.

AO1 = 4
[Total 4 marks]

Q3.

Point marked

Allow 1 mark per valid point with extra mark(s) for developed points (d). Credit examples where appropriate. For example:

Notes for answers

- Salinisation is the accumulation of salt within soil (1). It occurs when evapotranspiration is greater than precipitation where the water table is near to the surface (1) (d). The salinity reduces agricultural productivity (1) (d).
- In well-drained soils, with sufficient rainfall and/or effective irrigation salts are leached out so increasing salinity does not present a problem (1) (d).
- Evaporation of moisture from the surface results in salts being drawn upwards by capillary action (1), in extreme cases leading to the deposition of salt as a hard crust (1) (d). The concentration of salts in the topsoil affects the roots of crops which are intolerant to salt (1). This causes reduced yields and over time salinisation kills the crops (1) (d).
- Salinisation is often the result of over-abstraction of groundwater and the use of irrigation in warm climate (1). Salinisation inhibits osmosis and makes it difficult for plants to absorb soil water (1).

The Notes for answers are not exhaustive. Credit any valid points.

AO1 = 4
[Total 4 marks]

Q4.

AO1 – Knowledge and understanding of strategies used to ensure food security.

AO2 – Application of knowledge and understanding to evaluate Ghana's strategy and other strategies in ensuring food security.

Mark scheme

Level 3 (7–9 marks)

AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.

AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented.

Level 2 (4–6 marks)

AO1 – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.

AO2 – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging / evident with some

relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented.

Level 1 (1–3 marks)

AO1 – Demonstrates basic / limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented.

Notes for answers

The question requires an evaluation of strategies to improve food security. Answers should apply knowledge and understanding to the food strategy shown in the diagram and alternative strategies studied. The question refers to 'strategies' so the strategy in the diagram should be evaluated with at least one other strategy considered. No requirement to name the alternative strategy.

AO1

- Knowledge and understanding of term food security. The availability and adequate access at all times to sufficient, safe and nutritious food.
- An awareness of regions / countries at risk of food insecurity. Highest risks found in Africa, Middle East and South Asia. Strategies used to ensure food security will be dependent on level of food security and local conditions / governance.
- Strategies to increase food security focus either on improved food production or reduction of food waste.
- Knowledge of strategies using biotechnology such as the Green Revolution. New seeds can tolerate specific conditions such as drought or salinity.
- Aeroponics and hydroponics grow plants without the need for soil. This benefits areas that have infertile soils or high levels of soil erosion. It is used widely in Almeria, Spain growing much of the EU's fruit and vegetables.
- Irrigation improves food production in areas that have an unreliable water supply and can increase crop yields by 400%. It can also bring marginal land under cultivation to areas of high levels of food insecurity.
- Waste reduction schemes mean more food available for consumption. Such strategies widely used across the EU.
- Knowledge and understanding of social protection schemes to improve food security. For example, free school meal programmes in the UK aimed at reducing hunger and poor nutrition in vulnerable families.

AO2

- Analysis of the diagram to address how it is attempting to improve food security in Ghana. Growing a wider variety of crops, focusing on 5 which are staple foods in Ghana. Investing in new varieties of seeds to increase yields. Encouraging private investment and purchasing of land to increase levels of cultivation.
- Evaluation of the likely successes in the diagram. The amount of land that is cultivated will increase. Greater levels of investment may mean that marginal land in the arid north can be cultivated. Private companies can probably invest in irrigation schemes and use biotechnology to increase crop yields. By focusing on five staple foods, such as cassava, they can feed the local population rather than growing food that is not eaten locally.
- Evaluation of the possible problems of the the diagram strategy. Local farmers have not been consulted and they may well feel neglected by the government. Local farmers may not be able to afford new seed varieties or will get into debt. They may be outcompeted by TNCs and will lose out on land. TNCs may export much of the food so this will not benefit local people.

- Analysis and evaluation of alternative strategies to ensure food security. Irrigation increases crop yields and the amount of land that can be cultivated. However large-scale schemes can be very damaging to the environment. Local rivers can be drained of useable water meaning local people lose their water supply. Salinisation is frequently an issue in hot areas. Hydroponics is very expensive and so doesn't benefit local farmers who lose out to TNCs. However it does provide jobs to local people and can increase the variety in local diets.
- Overall assessment may emphasise that success of strategies to increase food security may depend on a variety of factors. However local farmers often lose out where large scale government-led schemes are used. The impact of different stakeholders may be considered as well as the overall level of food security.

AO1 = 4, AO2 = 5

[Total 9 marks]

Q5.

AO1 – Knowledge and understanding of two key zonal soils. Knowledge and understanding of the relationship between climate, soils and human activities.

AO2 – Applies knowledge and understanding to evaluate the relative importance of two key zonal soils in determining human activities.

Level 3 (7–9 marks)

AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.

AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented.

Level 2 (4–6 marks)

AO1 – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.

AO2 – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging/evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented.

Level 1 (1–3 marks)

AO1 – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented.

Notes for answers

This question requires links between two different aspects of population and environment, namely the study of two key zonal soils and their relationship with human activities. Human activities could include agriculture and industry but may also include population densities, distribution or change. They may also consider alternative futures as a result of environmental change and technological advances.

Responses will vary according to the key zonal soils studied. Likely soils are chernozems, latosols and podsols.

Max L1 for generic responses with no identifiable soil types. If more than two soils included, credit best two responses.

AO1

- Distribution of the two key zonal soils.
- Characteristics of the two soils, for example, acidity, drainage, fertility and related climate types.
- Knowledge and understanding of the link between soil type and agricultural. For example, chernozems have high natural fertility so favour modern farming practices such as cattle ranching and arable cropping.
- Global patterns of population density and factors affecting change.
- Global patterns of agriculture.

AO2

- Analysis of the link between the distribution of the two soil types and human activities in those areas. For example, Chernozems occur across the continental interiors of North America and Russia. In these areas there are low population densities but wide agricultural uses. Latosols are found across tropical areas associated with tropical rainforests and shifting cultivation has traditionally been practiced in these areas.
- Evaluation of the importance of the role played by soil type in determining human activity. For example, chernozems are very fertile, allowing greater agricultural productivity. However, this also means they tend to have lower population densities as the land is used for agriculture and therefore is not urbanised.
- Analysis of the factors that determine human activities, related to soil types. For example, podsols are found where climate types are not favourable for human occupation as winter temperatures are frequently below freezing. In the UK podsols are associated with upland areas of Scotland, making building construction difficult.
- The relative importance of the soil in determining human activities. For example, Podsols are unsuitable for arable farming due to their acidity. However, they also occur in cold environments which are not conducive to fast crop growth so it could be considered that climate is more important.
- Ferrasols are very important in determining human agriculture types. Typically, they would have had shifting cultivation practices taking place due to low nutrient levels. They need high fertiliser use for any commercial agriculture use, also relying on a permanent vegetation cover, as most of the nutrients occur in the biomass, meaning that plantation farming tends to be the most successful.
- Analysis of other factors that may be more important than soil type in determining human activities. Latosols are found across SE Asia, where rapid industrialisation has taken place, this has happened as a result of cheap labour supplies and other factors and is not related to soil type.
- Analysis of alternative futures may be considered, for example food demand increases commercial agriculture in latosol areas, resulting in forest clearance. The soil type becomes less important as new technologies allow us to overcome some of the problems of such soils.
- Students may come to an overall conclusion as to relative importance of the two key zonal soils and this should be based on the evidence presented.

Credit any other valid approach.

AO1 = 4, AO2 = 5
[Total 9 marks]

Q6.

AO1 – Knowledge and understanding of the links between key physical environmental variables and agricultural production.

AO2 – Application of knowledge and understanding to analyse and evaluate the extent to which there is a relationship between key physical environmental variables and agricultural production in Almeria and other areas studied.

Level 3 (7–9 marks)

AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.

AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well balanced and coherent argument is presented.

Level 2 (4–6 marks)

AO1 – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.

AO2 – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging / evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented.

Level 1 (1–3 marks)

AO1 – Demonstrates basic / limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented.

Notes for answers

The question requires understanding of the links between climate and / or soils and agricultural production. Answers should apply knowledge and understanding to agricultural production in Almeria as shown in the figures.

AO1

- Knowledge and understanding of different agricultural systems and productivity. For example, subsistence farming produces lower yields. Intensive farming using high level investments can result in year-round crops grown artificially and higher yields.
- Knowledge and understanding of the effects of soil quality / type on agricultural production for example pH, mineral content, depth and capacity to retain water. For example, barley does not usually tolerate pH values lower than 6.0.
- The impact of climate on production. Total rainfall will affect production levels but often seasonal variation has a larger impact. Wind strength and frequency affect crop growth negatively and positively. For example, the warm Chinook winds in North America melt snow on the Prairies, extending the growing season. Temperature affects the length of the growing season.
- Awareness of other key physical variables such as relief and drainage and their impact on production. For example, slopes above 11° are unsafe for ploughing so in such areas, pastoral farming often dominates.
- Knowledge and understanding of the need for human intervention to increase food production in areas where the climate and / or soils make food production difficult.
- Awareness of the impact of climate change on production. New crops may be grown in the UK, for example, increase in vineyards in Kent due to milder winter

temperatures. Decline in blackcurrant crops due to milder winter temperatures in East Anglia. The frost was needed to ensure that the buds open properly.

AO2

- Analysis of the links between the climate and production in Almeria. Rainfall levels are very low and there is seasonal variation. This would suggest that crop production would be difficult, particularly as rainfall is lowest when temperatures are at their highest. This would also result in greater water loss due to evaporation. However, they may also note that temperatures never fall below 12° so production is possible throughout the year.
- Analysis of the soil conditions shown in **Figure 1** and the implications for production. Soil appears to be very stony and dry. They may perceive this to be a red latosol due to its colour and the high summer temperatures and this should be credited. In this case, they may suggest it is infertile.
- Analysis of possible soil problems. Soil erosion likely to be an issue due to heavy winter rainfall and over-cultivation. There could be rapid run-off due to mountains in background. This could reduce production yields.
- Analysis of likely agricultural production in Almeria. Flat land that is extensive suggests crop production would be possible. They may suggest that pastoral yields would be very low due to high temperatures.
- Evaluation of the extent of the link between rainfall and the graph showing production. The value is extremely high so the conclusion should be that some sort of human intervention must be taking place as production of these levels would be very difficult with such low levels of rainfall. They may note that these crops will all require high levels of rainfall.
- Evaluation of the link between temperature and the graph showing production. These are all crops that need heat so there is a clear link. They may note that they are only grown in summer months in the UK or in greenhouses. The Almeria temperatures probably mean that tomatoes etc. can be grown all year round increasing the amount that can be exported.
- Analysis of the extent of the link in Almeria between key physical variables and the levels of production. They should conclude that it must be human intervention for example the large plastic greenhouses. Crops might be grown using hydroponics or irrigation.
- Evaluation of the extent of the link between key physical variables and agricultural production in other areas. For example, the clear link between ideal wheat growing areas in the Prairies – large areas of flat land, with moderate levels of rainfall. The low winter temperatures are modified by the Chinook winds that melt the snow extending the growing season.
- Evaluation of future alternatives. For example, some may conclude that the link will become less important in the future as technological advances mean that we can overcome limitation on production due to key physical variables. Impact on climate change may mean adaptation becomes increasingly necessary.
- Some may conclude that unusual climate change events such as severe storms may have large impact on production. This was evident this winter when unusual snow in Almeria, followed by flooding caused yields to drop by about 30% in January 2017. This caused shortages of some vegetables such as courgettes in British supermarkets.

AO1 = 4, AO2 = 5

[Total 9 marks]

Q7.

AO1 – Knowledge and understanding of two major climatic types and the relationship with human activities.

AO2 – Application of knowledge and understanding to evaluate the role of precipitation in

influencing human activities.

Mark scheme

Level 3 (7–9 marks)

AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.

AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well-balanced and coherent argument is presented.

Level 2 (4–6 marks)

AO1 – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.

AO2 – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging/evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented.

Level 1 (1–3 marks)

AO1 – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is presented.

Notes for answers

The question requires an understanding of the link between precipitation and human activities. Candidates should consider the extent to which precipitation influences human activities in two climatic types. Answers will vary according to the climatic types studied. Likely types are monsoon, polar tundra, semi-arid and Mediterranean climates. If only one climate type considered max L2. If no climate types stated or inferred max L1.

AO1

- Knowledge and understanding of the characteristics and distribution of climate types.
- The relationship between climate type and population numbers. For example, polar climates only have an average population density of 4 people per km².
- The relationship between climate type and human activities – permafrost in the Tundra prevents arable farming unless there is some form of artificial surface used.
- Knowledge of agricultural systems and productivity.

AO2

- Analysis of the role played by precipitation in human activities. Rice farming needs intense amounts of rainfall so relies on the monsoon rains and the intense convection caused by heat land surface of India and relief rainfall rising over the Western Ghats and Himalayan Foothills.
- In polar climates precipitation levels are relatively low and not important in human activities. Inuit agriculture is based on hunting animals such as reindeer or caribou and precipitation lacks an important role.
- Evaluation of the extent to which precipitation is a controlling factor in human activities. In India, agriculture (dominated by rice) accounts for 18% of GDP. The monsoon rains are essential for this.
- In polar climates agriculture is not a major human activity. Fishing, tourism and

mineral exploration contribute more to GDP and are not dependent on precipitation levels.

- Evaluation of other climatic factors that play a role in human activities may be considered. For example, in polar climates, temperature is far more a control on human activities than precipitation. In the autumn Inuit groups such as the Gwitch'in traditionally move south to hunt caribou moving north into the breeding grounds in the spring.
- The contrast in the role of precipitation in the two climatic types may be considered.
- A legitimate approach would be to consider how human intervention reduces the role of precipitation in human activities, for example, artificial greenhouses and hydroponics / aeroponic farming in Almeria in the Mediterranean mean precipitation is now less of an influence.
- Alternative possible futures may also be considered by looking at the impact of climate change on agriculture and human activities. For example, in the Sahel semi-arid climate, rainfall levels are less reliable, and this is making agriculture increasingly challenging.
- There may be an overall conclusion considering the extent to which precipitation is important in controlling human activities. This will depend on the climate types and should be supported by evidence in the response.

Credit any other valid approach.

AO1 = 4, AO2 = 5

[Total 9 marks]

Q8.

AO1 – Knowledge and understanding of strategies to ensure food security. Knowledge and understanding of global governance.

AO2 – Applies knowledge and understanding to analyse and evaluate the extent to which global governance is necessary to ensure food security.

Mark scheme

Level 3 (7–9 marks)

AO1 – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.

AO2 – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation is detailed and well supported with appropriate evidence. A well-balanced and coherent argument is presented.

Level 2 (4–6 marks)

AO1 – Demonstrates some appropriate knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.

AO2 – Applies some knowledge and understanding appropriately. Connections and relationships between different aspects of study are emerging/evident with some relevance. Analysis and evaluation evident and supported with some appropriate evidence. A clear but partial argument is presented.

Level 1 (1–3 marks)

AO1 – Demonstrates basic/limited knowledge and understanding of concepts, processes, interactions and change. These offer limited relevance with inaccuracy.

AO2 – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation basic and supported with limited appropriate evidence. A basic argument is

presented.

Notes for answers

This question makes connections across two different units, namely 'Population and the Environment' and 'Global Systems and Global Governance'. Links should be made between strategies to ensure food security and the role played by global governance. Expect to see reference to the work of the UN but this is not necessary to answer the question.

AO1

- Global and regional patterns of food production and consumption
- Knowledge and understanding of strategies to ensure food security
- Issues associated with attempts at global governance, including how the UN in the post-1945 era, can work to promote growth and stability but may also exacerbate inequalities and injustices
- An understanding of how Interactions between the local, regional, national, international and global scales are fundamental to understanding global governance.

AO2

- Evaluation of strategies to ensure food security on a global scale. For example, the green revolution has been successful in producing rice and wheat varieties that are high yielding, increasing agricultural productivity. Rice yields have more than quadrupled since 1960s.
- Evaluation of strategies used on local or national scales. For example, Niger's initiative of 3N led to use of improved seed varieties and transfer of surplus milk resulting in decreased food insecurity and a GDP rise of 3% in one year.
- The role of global governance in increasing food security might consider the role of organisations such as GAFSP and World Bank in increasing agricultural productivity. Between 2010 and 2014 they improved food security in 31 of the poorest nations.
- Evaluation of the role of global governance in improving post-harvest practices. For example, the World Food Programme invested in research into improving post-harvest practices by training local farmers in Uganda and Burkina Faso.
- The extent to which NGOs can also be a global force in improving food security, for example, the Hunger Project aims to increase food productivity in 11 countries across the globe. They focus on community-led projects letting farmers take control of their own production.
- The relative importance of global governance and globalisation might be considered. For example, globalisation may be responsible for the persistence of food insecurity making need for global governance essential. Role of TNCs in creating food insecurity.
- Different attitudes and values towards food security may be considered. For example, global governance is essential as there is enough food to feed 7 billion people, but it is not distributed fairly so organisations such as the UN need to be involved. Others believe that no amount of global governance will ensure food security as we simply can't produce enough food.
- Alternative possible futures such as climate change increasing food insecurity making global governance more necessary. Technological advancements mean that more food can be grown per hectare making global governance less important.
- Students should come to a conclusion of the importance of global governance in reducing food insecurity. Any conclusion is valid as long as it supports the content of the response.

Credit any other valid approach.

AO1 = 4, AO2 = 5
[Total 9 marks]

Q9.

AO1 – Knowledge and understanding of strategies to ensure food security and the different perspectives on future population growth.

AO2 – Application of knowledge and understanding to assess the extent to which these strategies can support a positive perspective on population growth.

Notes for answers

The question requires links between different sections of the spec, namely the population and environment section in terms of strategies to ensure food security and the section on principals of population ecology, looking at perspectives on population growth and its implications. Some students may also consider prospects for global population – environment relationships.

AO1

- Knowledge and understanding of the main components of food security such as access, availability and stability.
- Knowledge of global patterns of current food security and food security risk.
- Knowledge of the role of agencies / organisations such as the World Bank or FAO in reducing food insecurity.
- Awareness of different opinions of agencies / organisations in how to tackle food insecurity.
- Understanding of current strategies, to increase food production through such schemes as the Green Revolution, irrigation, Aquaculture, Hydroponics and Urban Farming. Likely exemplars are Rwanda and the Land Husbandry, Water Harvesting and Hillside Irrigation project or the Green Revolution in the Philippines and India.
- Understanding of current strategies to improve post-harvest practices and reduce food waste through education, training, equipment and field-support. For example, new storage technology in Uganda and Burkino Faso reduced losses of grains such as Maize. In Niger, transfer of surplus milk from the North to the South reduced losses of milk.
- An understanding of the challenges in reducing food waste, particularly in tropical climates where a lack of technology means that much food is spoilt. For example, India is the world's largest producer of bananas but only accounts for 0.3% of the world banana trade.
- An understanding of how improving post-harvest practices can potentially improve the health of a population. For example aflatoxins in crops in maize are highly carcinogenic and occur due to contamination during harvest. Improved storage techniques could reduce mortality rates.
- Knowledge and understanding of possible future strategies to reduce food insecurity such as crop wild relatives and new research.
- Knowledge and understanding of the different perspectives on population growth considering both positive and negative predictions on the balance between population and resources.
- Knowledge and understanding of positive perspectives such as those proposed by Boserup and Simon. A consideration that population growth stimulates the advances needed to support the population growth. Evidence in support includes technological advances such as the Green Revolution.
- A consideration of pessimistic perspectives such as that of Malthus and Neo-Malthusians, suggesting that catastrophes such as famines and civil war are 'checks' on future population growth. This is supported by evidence such as famines in Ethiopia, War in Sudan.

AO2

- An understanding of the links between opinions on food security and the relationship with different perspectives on population growth.

- An evaluation of how different opinions / perspectives may lead to different approaches in dealing with food insecurity. The FAO believe that enough food is produced but losses due to poor storage, overconsumption and waste contribute to 800 million people being malnourished. However the World Bank believes that food production needs to increase by 50% by 2050 to feed everyone.
- An assessment of the success of strategies to increase food production in reducing food insecurity and future famines. E.g. irrigation can increase crop yields between 100 and 400%, therefore reducing poverty and hunger. In Niger the 3N scheme has increased GDP by 3% driven by agriculture, reducing food insecurity and famine.
- An evaluation of the effectiveness of different strategies at local, regional or national level in tackling food insecurity. Variations in countries at different levels of economic development may see different degrees of success and therefore opinions on the balance between population and resources may be different.
- Effectiveness linked to socio-economic factors. Poverty and lack of education are barriers to success in increasing food production or reducing food losses. This increases risk of food insecurity and links to a pessimistic viewpoint. The widening gap between areas with low insecurity risk and those with high insecurity risk.
- Analysis of future risks in the light of environmental change. Increased risk due to climate change may mean current strategies will be ineffective at reducing food insecurity and the impact on future population growth may well be negative. Increased probabilities / risk prediction of famines – ‘checks’ on population growth. On the other hand, climate change may drive the search for new strategies to increase food supply and alternative futures.
- Analysis of current areas of food insecurity such as sub-Saharan Africa and the impacts of food insecurity in these areas. Analysis of the challenges of increasing food supply and why this may lead to a negative perspective such as the recent Civil War in South Sudan and subsequent famine.
- Analysis of the likely impacts of increasing food security in the developing world, leading to future population growth due to reduced mortality rates. Evaluation of different perspectives on future perspectives as to whether this will lead to catastrophic Malthusian checks or further technological advances in increasing food production.
- Evaluation of evidence in support of positive perspectives, the success of strategies at reducing poverty and food insecurity at a global level.
- Evaluation of other factors which may contribute to alternative population futures. For example, higher levels of food security may lead to lower levels of infant mortality and subsequently birth rates may fall, therefore lowering future population growth.
- Conclusion should support the main arguments. Students may have a broad variety of viewpoints and this is acceptable as long as they have given evidence in support. There should be an assessment of to what extent they agree that current strategies support a positive perspective. They may conclude that there is total support and that strategies in developing countries have shown that Malthusian checks can be avoided. They could also conclude that current patterns of food insecurity indicate that a Malthusian perspective is more accurate, taking into account recent famines and wars despite intervention and strategies from NGOs, the World Bank and other organisations.

Level 4 (16–20 marks)

- Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2).
- Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).
- Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).

- Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).
- Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).

Level 3 (11–15 marks)

- Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).
- Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).
- Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).
- Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).
- Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).

Level 2 (6–10 marks)

- Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).
- Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).
- Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).
- Some knowledge and understanding of key concepts, processes and interactions and change (AO1).
- Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).

Level 1 (1–5 marks)

- Very limited and / or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).
- Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).
- Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Very limited relevant knowledge and understanding of place(s) and environments (AO1).
- Isolated knowledge and understanding of key concepts and processes (AO1).
- Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).

Level 0 (0 marks)

- Nothing worthy of credit.

AO1 = 10, AO2 = 10
[Total 20 marks]

Q10.

AO1 – Knowledge and understanding of soil problems and their management. Knowledge and understanding of the concept of carrying capacity. Knowledge and understanding of factors affecting population change.

A02 – Application of knowledge and understanding to evaluate the link between population growth / increased consumption and soil problems, and the degree to which this can be managed.

Notes for answers

The question requires links between several aspects of the Population and the Environment section of the specification, specifically soil problems and their management and the concept of carrying capacity. It also links the idea of population growth and pressures on agriculture due to increased production and consumption.

A01

- Knowledge and understanding of the concept of carrying capacity.
- Knowledge and understanding of soil problems relating to agriculture – soil erosion, waterlogging, salinization etc.
- The causes of soil problems in relation to agriculture.
- Knowledge of strategies to manage soil problems such as field drains and tree planting.
- Awareness of the global and regional patterns of food production and consumption.
- Understanding of the issues around food security and strategies to manage these.
- Knowledge of population growth dynamics – underpopulation, overpopulation and optimum population.
- An appreciation of perspectives on population growth would also be appropriate for example, Malthusian viewpoints versus Boserup ideas.

A02

- Evaluation of the link between population pressures and soil problems. The extent to which population pressure increases the likelihood of soil problems.
- Evaluation of the causes of soil problems for example, commercial farming, population growth, demands for exotic food, climate change.
- Analysis of the extent of future soil problems in the light of environmental change. Climate change may present new challenges. More land will become marginal.
- Evaluation of strategies to reduce population growth. Awareness of alternative futures in managing population growth.
- The extent to which soil problems cause countries to exceed their carrying capacity would also be appropriate. For example, soil erosion means that it is difficult to grow crops to support a population. In the Sahel many countries have already exceeded their carrying capacity for this reason.
- The extent to which carrying capacity is exceeded for other reasons, for example, conflict, population growth, climate change and natural hazards.
- Assessment of the link between soil problems and overpopulation. For example many areas of the Indus Valley are now abandoned due to salinization meaning this area has high levels of out-migration as it can't simply support the local population.
- Varying levels of success in managing soil problems leading to increased yields, for example contour stones in Burkina Faso have reduced problems of soil erosion meaning carrying capacity is increased.
- An evaluation of the effectiveness of strategies to manage soil problems and the factors affecting mitigation of soil problems. Awareness of alternative futures in managing soil problems.
- The extent to which management of soil problems can in turn lead to increased yields and therefore support a population, reducing likelihood of carrying capacity being exceeded.
- The extent to which the statement applies in different countries / regions may also be considered. Carrying capacity is less likely to be exceeded in HICs who can afford to import food and mitigate against soil problems. However HICs may increasingly cause soil problems in LICs due to increased demands and consumption as a result of increasing affluence.
- Some may conclude that soil problems are caused by intensive commercial farming

and demands from HICs rather than population growth. This would be an appropriate conclusion.

- Students should come to an overall conclusion as to whether they agree that soil problems are inevitable and the extent to which these can be managed. Any viewpoint is valid as long as it is supported by the evidence presented in the response.

Credit any other valid approach.

Level 4 (16–20 marks)

- Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2).
- Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).
- Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).
- Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).
- Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).

Level 3 (11–15 marks)

- Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).
- Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).
- Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).
- Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).
- Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).

Level 2 (6–10 marks)

- Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).
- Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).
- Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).
- Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).
- Some knowledge and understanding of key concepts, processes and interactions and change (AO1).
- Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).

Level 1 (1–5 marks)

- Very limited and / or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).
- Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).
- Very limited and rarely logical evidence of links between knowledge and

understanding to the application of knowledge and understanding in different contexts (AO2).

- Very limited relevant knowledge and understanding of place(s) and environments (AO1).
- Isolated knowledge and understanding of key concepts and processes (AO1).
- Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies (AO1).

Level 0 (0 marks)

- Nothing worthy of credit.

AO1 = 10

AO2 = 10

[Total 20 marks]

Examiner reports

Q3.

This question was completed successfully by those students who clearly knew the concept of salinisation and its impacts on plants and agriculture so could score four marks quite readily. Secure subject knowledge was the key to gaining marks here as in other AO1 focused questions.

Q4.

In text-based resources, students need to identify the relevant information and then utilise it to address the question. Many students simply copied out large sections of the text and attempted to evaluate. These responses tended to score at the lower end of the mark range as AO1 was very limited. Better responses evaluated different strategies and compared them to the information in the diagram. The best answers evaluated the scheme in the diagram and then compared this with other strategies in terms of the likely success in addressing food security.

Q7.

Many students were not able to even identify two climate types. There were frequently vague references to 'dry' and 'wet' areas. These answers typically struggled to access anything above L1. Many students were not able to make links between the climate and human activities. Many responses were limited by lack of reference to precipitation, considering the overall climate. This was particularly true where polar climates were used. Although the question referred to human activities, most students limited their responses to agriculture. Where students had prepared well, they were able to use their detailed knowledge of farming and relate this to knowledge of precipitation for the chosen climate type. For example, there were some very detailed responses about monsoon rainfall and rice farming.

Q8.

This question proved quite challenging. This was the cross-specification question and required students to link their knowledge of global governance and food security. Answers were frequently very generic, showing a lack of application of knowledge between the two units. They were often able to write about food security but their understanding and application of the concept of global governance was often very limited. Only a few students used specific knowledge of UN agencies studied in the global governance unit in this question. Better answers concentrated on FAO and famine relief or on the Millennium Development Goals. Some students accessed higher marks by evaluating other factors relative to global governance, this was a legitimate approach. For example, considering the success of the green revolution or NGOs in comparison to the work of the UN. Some students considered recent events in Ukraine, which was creditworthy and showed good awareness of current global issues and 'thinking like a geographer'.

Q10.

This question proved quite challenging with over half of students failing to achieve level 3 and above. Responses indicated the need for students to prepare to make links both within and across the specification and to ensure that they answer all parts of the question.

Many students knew what carrying capacity was and linked population pressure to soil

problems. Some drifted into generic responses about the views of Malthus and Boserup, which offered some relevance but failed to address the whole question. Less effective responses often featured explanation and description of soil problems or mitigation strategies only. They also offered little in the way of evidence in support. Students should be encouraged to use specific examples even when not asked for them.

More effective responses linked increasing population pressures with increasing soil problems such as salinisation and waterlogging. These were supported with specific place or soil type examples. They then suggested how these soil problems could be managed by strategies such as hydroponics and irrigation. The most effective responses further considered the extent to which soil problems could be managed given future population pressures. Such responses were clearly supported by an evidence-based conclusion.