

ENVIRONMENTAL MANAGEMENT

Paper 0680/11
Paper 1 Theory

Key messages

- Candidates should read the questions with care, taking time to study command words and words which indicate the context of the question. Command words such as 'describe' and 'explain' have specific meanings which candidates need to respond to. Where the command word is 'describe', candidates should not spend time giving explanations, as these will not be credited.
- The focus in all questions and the context should be considered carefully – this could include causes or effects, problems or benefits, people or the environment, and local or global.
- In order to write answers which contain the appropriate detail and number of points, the mark allocations and answer spaces provided in the question and answer booklet should be seen as a guide for candidates.
- Definitions of subject-specific terms should be learnt in order to define and accurately use them. When defining terms, candidates should try to avoid repeating a part of the word being defined in their definition and use completely different wording.
- When describing a trend on a graph, candidates should look for a pattern or relationship – words such as increase, decrease, constant, plateau, fluctuate, for example, should be considered in such responses. If appropriate, answers should be backed up with selected data from the resource.
- Candidates should show their workings in all calculations even if this is not specifically asked for in the question.

General comments

The examination differentiated well between candidates of all levels. The strongest responses showed competence across the paper and good answers were seen to all questions set. Most candidates were able to make an attempt at all parts of the questions.

Candidates should continue to practise using graphs of different types; bar charts, pie charts, tables of data, photographs, diagrams and maps. Graph completion tasks should be done with care, using a ruler and sharp pencil to produce the required precision. When completing a bar chart, bars should be of the same width as pre-existing bars and the key should be followed precisely. When drawing a pie chart, candidates should plot the sectors in rank order, with the largest plotted first, starting at the top and proceeding in a clockwise direction. If shading is required as part of a question, pencil should be used rather than pen.

In **Question 8(b)**, the prompt 'To what extent do you agree with this statement?' required candidates to make an evaluation. Candidates needed to decide how much they agreed with the statement based on the evidence in their argument. They were then required to develop their ideas as fully as possible, elaborating on or linking points to answer the question, rather than just including general information about the topic. Use of relevant examples or case studies enabled access to higher levels of credit.

Candidates should offer full explanations wherever possible, rather than simply list - general responses such as 'pollution' need further development, for example, 'water pollution'.

Some candidates struggled to differentiate between the natural greenhouse effect, enhanced greenhouse effect and ozone depletion. There was some uncertainty amongst candidates about the structure of the atmosphere.

Comments on specific questions

Section A

Question 1

- (a) (i) The vast majority of candidates read the table accurately and gave the correct answer, Canada. The most common incorrect answer was Zimbabwe, which in the table was the country with the second lowest annual production of lithium.
- (ii) This question proved to be difficult for some candidates. 20 years was the correct answer ($16 \div 0.8$) but a common error was $0.8 \times 16.0 = 12.8$.
- (iii) Candidates were able to gain good credit on this question, showing sound understanding as to why the demand for lithium from Chile will increase in the future. Candidates referred to the large reserves of Chile, increasing population and the demand for more batteries.
- (b) There were some very good answers which detailed a whole range of strategies. The ideas of recycling and improved efficiency in extraction and use, were discussed effectively. Weaker responses suggested alternatives to lithium rather than addressing the idea of sustainability.

Question 2

- (a) Many candidates gave the correct answer of 4 731 899 914 and a few converted the figure to a percentage, which was also credited.
- (b) A sizeable minority found this question difficult. The key command of 'describe the trend' for the age distribution caused some confusion. When giving differences between the age distributions, those candidates who picked out the contrasts between 1950 and 2100 scored well (decrease in young people, increase in middle aged, increase in old people). Those who described the changing shape of the diagrams, without interpretation, scored less well. Data to support was credited if it was comparative in nature and accurate. Where candidates stated either the male or female age range only for their supporting statistics, credit was not given.
- (c) Many candidates provided sensible reasons as to why the population pyramid in 2100 might be different from the predicted population pyramid in 2100. Changes to the birth rate, risk of pandemic and war were the most common answers.

Question 3

- (a) (i) The vast majority of candidates plotted the bar chart accurately; the width of bar being drawn correctly in most cases. Where an error occurred it was usually due to the inaccurate plotting of the endangered and vulnerable species. Nearly all candidates gained credit for the correct order of the key and shading.
- (ii) Most candidates correctly stated 12%.
- (b) (i) This question presented few problems and the majority of candidates were able to show a sound understanding of the concept of a seed bank. Credit was not given when conservation was referred to as this repeated the wording in the question. References to animal sperm banks were not credited.
- (ii) The majority of candidates correctly calculated the number of plant species in the world, 312 500, from the information given.

Section B

Question 4

- (a) There were mixed responses to this question requiring candidates to complete a pie chart. Most responses scored credit for the correct application of the key, although inserting just the percentage on the dotted lines was not creditworthy. The terms 'underfished', 'fully fished' and

'overfished' were required with a suitable shading. More precision was sometimes needed with the plotting.

- (b) Those candidates who were able to demonstrate a clear understanding of food chains and food webs often achieved full credit on this question. Some responses used a specific example of a predator, such as a shark, and this approach proved very effective. The weaker responses contained information on a lack of food for predators and needed to go on to link this idea to the impact on food webs.
- (c) (i) This question produced some excellent answers, with a significant number of candidates expressing thoughtfully considered responses which often showed an impressive understanding of the strategies deployed to make fishing more sustainable. Many candidates described more than the required three strategies. A minority of candidates were not sufficiently clear as to the difference between net size and mesh size.
- (ii) The focus of this question was on international cooperation. In most cases, candidates were able to identify that international cooperation was needed to maintain fish stocks because oceans are shared, fish migrate across national boundaries and unless all countries work together the effect is limited. Other candidates did not fully understand the question. Explaining that maintaining fish stocks was important as a valuable food resource to humans and discussing the need to maintain livelihoods were not creditworthy responses.

Question 5

- (a) Most candidates were able to correctly complete the table of renewable and non-renewable energy resources from the list of words provided. A small number of candidates mistakenly placed biofuel in the non-renewable column. When biofuel (or another energy resource) was listed in both the renewable and the non-renewable column, no credit was given.
- (b) (i) Most candidates suggested three appropriate strategies for reducing the use of energy within the home. The most common correct response was turning off electrical devices when not in use. The idea of education needed to be qualified to gain credit.
- (ii) This question required candidates to suggest reasons why reducing the use of energy within the home is an important environmental issue. Successful responses stated the link between burning fossil fuels and the release of a greenhouse gas, and the contribution this makes to global warming.
- (c) (i) Most candidates were able to describe comprehensively how geothermal power is used to generate electricity, with many discussing how the generator turns kinetic energy into electrical energy. A common misconception was that the water pumped into the ground was heated through contact with magma. Contact with hot rocks was the required response for this marking point.
- (ii) Some candidates found it challenging to suggest reasons why geothermal power is not used to generate electricity in some countries. Candidates understood the need for the correct geological conditions and needed to further consider the expense of this method.

Question 6

- (a) (i) Candidates were asked to complete the diagram of the Earth's atmosphere by labelling 3 layers, the stratosphere having already been given in the diagram. Most candidates were confident labelling one of these layers, usually the troposphere; the correct labelling of the thermosphere and mesosphere proved to be challenging for some.
- (ii) The majority of candidates were successful in stating the height of the stratosphere above the Earth, from 20 km to 50 km.
- (iii) Responses to this question were variable. The stratosphere is the layer which has the highest concentration of ozone, yet a sizeable number of candidates drew the required **X** outside the Earth's atmosphere or in the thermosphere. Some candidates omitted drawing the **X**.
- (b) For this question, candidates were required to describe the natural greenhouse effect. A good proportion of responses mentioned solar radiation from the sun and were credited for naming a

greenhouse gas. Some candidates incorrectly discussed the role of CFCs and ozone depletion in the stratosphere.

Question 7

- (a) Most candidates displayed a clear understanding of the movement of plates and the resultant cause of earthquakes.
- (b) Many candidates made good use of the diagram showing the design of an earthquake-resistant building. The relevant building designs were identified and the link made between the design and impact reduction. The label 'ground level' was not one of the designs. Weaker responses simply described the designs or did not describe how the designs would reduce the impacts in sufficient detail.
- (c) (i) The vast majority of candidates correctly identified the Richter scale as that used to measure the magnitude of an earthquake. Some candidates correctly stated the moment magnitude scale. Not credited was 'seismometer' as this is an instrument and 'seismograph' which is not a scale.
- (ii) Iran was the correct answer. The country had four earthquakes occurring in a 14-day period in 2018. A minority of candidates did not interpret the table correctly and focused on the countries with the highest magnitude, incorrectly citing Peru or alternatively, USA.
- (iii) The majority of candidates correctly calculated 5145.
- (iv) Most candidates were able to suggest three good reasons why large magnitude earthquakes do not cause death or injury. It was common to see monitoring, disaster preparation and low population density cited as reasons. Land use zoning and depth of focus were seen less often. Education, prediction and timing of an earthquake needed to be qualified to gain credit.
- (v) Why people continue to live in places which are at high risk of earthquakes was well understood by the majority of candidates and suggestions were well developed. Many candidates discussed fertile soil but to gain credit the idea needed to be linked with employment to avoid confusion with volcanic activity, which was not the focus of the question.

Question 8

- (a) (i) Many candidates successfully selected the two figures to manipulate; fewer completed the percentage calculation.
- (ii) Candidates were required to interpret a bar chart to identify the trends in the use of grains. The majority of responses were able to conclude that the trend increased but that the rate of increase slowed down.
- (b) The six-mark, level of response question requires candidates to write a more extended answer. Arguments for and against the statement in the question are expected and should be balanced. The question calls for a very clear conclusion and evaluation from the candidate. The development of a point of view, supported by clear evidence, is important.

This question discriminated well and provided candidates with plenty of scope to construct well-argued accounts on whether farmers should grow food crops rather than biofuels. Many candidates rose to the challenge and there were some excellent responses. To reach Level 3, a candidate should take ideas and develop them as fully as possible, including relevant examples to evidence points made. Subject-specific vocabulary should be included, and the strongest responses showed evidence of some initial planning. Weaker responses did not focus on the full question and gave answers limited to just the growing of food or the growing of biofuels. In these less-effective answers, evaluation was often absent as was the inclusion of examples.

ENVIRONMENTAL MANAGEMENT

Paper 0680/12
Paper 1 Theory

Key messages

- Candidates should read questions with care and respond to the command verb to maximise the credit achieved.
- Candidates should attempt all questions in the paper as it may be possible for weaker candidates to gain some credit even if they are less familiar with the topic. It is not necessary for candidates to repeat the question in their answer. This does not gain credit and avoiding the practice allows best use of examination time.
- The six-mark, level of response question requires candidates to look at the given topic broadly. The use of appropriate examples to support their views is beneficial. This question benefits from a level of planning which was evident in some of the scripts seen.

General comments

Candidates generally demonstrated a broad range of knowledge with few topics unanswered, although sometimes the responses were not contextualised to the question posed, for example, in **Question 2(b)**, the role of fish farming in the regeneration of wild fish stocks was required, rather than merely the benefits of fish farming.

Other topics which showed some weakness, were an understanding of population changes and examples of pronatalist policies.

The six-mark, level of response question at the end of the paper was attempted by most candidates. The structure of many responses was improved over previous series. Scripts often included evidence of the answers being planned more extensively.

Candidates showed confidence in completing the mathematical activities within this paper and were generally able to form valid conclusions. Graph drawing was generally neat, although the use of a sharp pencil, ruler and eraser would have allowed for greater clarity in some cases.

There was a general weakness in the interpretation of the population graph.

Comments on specific questions

Section A

Question 1

- (a) (i) The majority of candidates were able to correctly identify the gas missing from the key as Nitrogen with most responses also able to complete the calculation linked to the pie chart.
- (ii) A wide variety of gases were given credit, although many cited examples which are present in extremely small volumes rather than those that are more common such as carbon dioxide, water vapour or argon.
- (b) While short responses gained the credit, there were a few examples where candidates gave detailed responses linked to photosynthesis in plants. There were a small number of examples of candidates incorrectly citing respiration in plants.

Question 2

- (a) (i) This question required candidates to apply the stated scale to the diagram to make a measurement. While a range of responses were given credit, a number of answers incorrectly measured the height of the continental shelf from the bottom of the diagram rather than to sea level as shown in the image.
- (ii) Most candidates attempted this question, with many being partially successful; the more able candidates managed to connect all the relevant issues to gain full credit. For example, many responses identified that the continental shelf was suitable for plankton growth and needed to go on to identify this as being a food source for fish.
- (iii) While attempted by most candidates, this question proved to be more challenging for many who identified that there were greater populations of fish on the continental shelf without relating this to the greater level of depletion. Stronger responses identified the ease of access close to the shore, or that smaller sized nets could be used in shallower water. Suggestions such as an increased level of pollution from the land were also given credit.
- (b) Many candidates showed considerable knowledge about fish farming, although limited their responses to the advantages of this method. These responses did not address the question posed, namely how fish farming would reduce the impact on wild fish stocks. The strongest answers identified that there was less fishing of the wild stocks which enabled time for breeding and the replenishment of the population.

Question 3

- (a) (i) The majority of candidates were able to correctly read the data from the graph to achieve an answer of 460.
- (ii) Most candidates attempted this more challenging question, many incorrectly assuming that the question required the observation of the decade, meaning they started their 10 year period at the year 2000.
- (b) Many responses correctly identified that natural disasters are random in their occurrence. The stronger responses also explained that disasters differ in intensity or duration which also impacts on the number of deaths that result. Weaker answers incorrectly attempted to describe how technological and medical advances meant there has been less impact in more recent years.
- (c) Most candidates were able to name at least one example of a disaster caused by tectonic plate movement with similar numbers giving volcanic eruptions, earthquakes or tsunamis.

Section B

Question 4

- (a) (i) A significant majority of candidates showed the appropriate skills in completing the bar graph; both plotting the bar at the correct height and also maintaining the width of the bars already present on the graph.
- (ii) Candidates showed good skills in ordering the data correctly and obtained full credit.
- (b) Most responses identified that the increase in agriculture would mean that more water would be needed for irrigation, and a few went on to explain that as the water is a finite resource, this would impact the availability of water for drinking. Many others also correctly identified the issues with pesticides and fertilisers leaching into the water system.
- (c) Trickle drip and clay pot irrigation were popular answers and responses generally showed a good knowledge of this subject area with no common misconceptions.

Question 5

- (a) (i) The task of completing the graph was accessible to most candidates, showing accuracy in plotting and the need to join the plots to the others on the graph.
- (ii) Most responses correctly identified that there had been an increase in energy use, although a number of candidates were inaccurate in reading the data from the graph.
- (iii) Many responses correctly identified that some countries had a smaller supply infrastructure or their populations did not have the income to afford electricity or electrical devices. Some candidates needed to take into account that the data related to electricity use per person and instead referred to the size of the population or using renewable sources for energy generation in their answers, which were not given credit.
- (b) It was important for the candidate to read and understand the focus of the question. Many answers referred to governmental actions rather than those which could be applied in a domestic environment. Similarly, the use of renewable sources would not reduce the overall use of energy in the home. Good responses included switching off devices when not in use, the use of more energy efficient devices and the use of insulation.

Question 6

- (a) This question required candidates to interpret the information in the text to form conclusions and demonstrate understanding of the unfamiliar scenario. This was completed with various levels of success. Some weaker answers copied information from the text, which was not awarded credit, whereas those who expanded on this information were able to achieve well. Many identified that lionfish would disrupt the food chain by eating smaller organisms and some identified that as a non-native species in the area, there were less predators.
- (b) This question, which required a description of the distribution of lionfish, was generally well attempted; many identifying the coastal locations and where these were in relation to the countries. A few candidates were able to describe the range of the distributions. The most common error was a confusion between East and West which had a large impact on describing a location. Credit was not awarded for stating areas where the lionfish were absent.
- (c) Most responses correctly identified that targeted fishing would reduce the risk of bycatch. Fewer responses identified that spear fishing would not damage the seabed or corals, whereas the use of nets was likely to cause this damage.

Question 7

- (a) (i) This question was very well answered with most candidates correctly calculating the maximum birth rate of 36.
- (ii) Fewer candidates were able to identify the areas on the graph that show when there was an increase in population. Several responses shaded part of the quartiles shown on the graph and needed to complete these for credit to be awarded.
- (iii) Only the most able candidates were able to access this challenging question and understand the processes within the graph to correctly position the X.
- (b) Candidates were generally well prepared for this question and wrote confidently. Most cited improvements to healthcare as being the main reason for a decrease in death rate.
- (c) A significant proportion of candidates answered in terms of antinatalist policies rather than pronatalist policies that were the focus of this question. Answers such as 'incentives' needed to be qualified with an example.
- (d) Candidates often correctly recognised that the large percentage of older people and decreasing proportions of the working age groups were problems and gave reasons for this. Many other candidates needed to understand that a population pyramid represents percentages of the total population and not specific numbers.

Question 8

- (a) (i) This question proved to be very accessible across the ability range of candidates. The skills were present to interpret the diagram and formulate clear reasons why the proposed site, A, would be unsuitable.
- (ii) Slightly more challenging, candidates tended to score well on this question, identifying the technical difficulty in deeper extraction and the reduced cost benefit with the smaller size of the mineral reserves.
- (b) Generally well understood, the majority of answers provided two distinct reasons why the mine might be beneficial to the local population, although a few focused on the benefits of subsequent land restoration, which was not given credit.
- (c) (i) Most candidates were able to use the information correctly and calculate the predicted year that reserves of zinc would be depleted, 2100.
- (ii) Most candidates interpreted the data correctly to be able to provide tin as the answer.
- (iii) Some candidates were able to quote answers clearly and concisely and these responses achieved full credit.
- (iv) The six-mark, level of response question requires a longer answer and allows candidates to draw together much of their knowledge of environmental management. The strongest responses address the question presented, ideally look at both sides of the argument and come to a clear conclusion. These arguments are often supported with specific examples.

There was significant evidence in many scripts that candidates had taken time to plan their answers to ensure they were logical and covered a range of viewpoints. The strongest responses attempted to balance the need to conserve resources or use them wisely, with the impact this would have on economic growth. Whilst the discussion topic will vary with each examination session, candidates continue to show improvement in their preparation for this style of question.

ENVIRONMENTAL MANAGEMENT

Paper 0680/13
Paper 1 Theory

Key messages

- Candidates need to be precise in their answers and avoid general statements.
- Candidates should ensure that their responses relate to the context of the question rather than writing more broadly about the issue. This includes responding appropriately to the command verb, e.g. 'explain', 'describe'.
- The six-mark, level of response question requires candidates to bring together a range of views and opinions, supported with relevant examples where necessary. There were some examples of this being completed well.

General comments

Most candidates attempted all questions on the paper. It was possible for weaker candidates to gain some credit even if their answers were incomplete. Candidates should be aware of the importance of reading the question carefully, not only the command verbs but also to provide a context for their answers. For example, **Question 8(a)(ii)** required two risks to human health other than bacterial disease. This meant reference to bacteria could not be credited.

There was evidence of better planning amongst the cohort for the longer response questions. This was particularly noticeable within the structuring of the level of response, six-mark question at the end of the paper, although there were still some responses in bullet point format. The strongest responses considered both sides of the statement and were able to support assertions with relevant examples.

Calculation based questions were generally completed confidently. Some needed to take greater care when considering the units provided on the answer line to avoid giving an inappropriate answer.

Areas of weakness amongst candidates were the characteristics of energy sources, the water cycle and details within a population pyramid.

Comments on specific questions

Section A

Question 1

- (a) (i) Most candidates attempted this introductory question correctly and showed confidence in interpreting the data in the diagram to reach the answer of 10.
- (ii) A slightly more challenging question, although most candidates were able to identify the relevant data to complete the calculation to achieve the answer of 52.
- (b) Whilst most candidates were able to complete the calculations in **Question 1(a)**, the interpretation of the information proved to be more challenging. Relatively few were able to obtain full credit; whilst many identified which type of farming used more land or produced more protein, few linked this data to efficiency.
- (c) Candidates were generally well prepared for this question which required them to state methods to increase yield. Responses for both crops and animal production were credited.

Question 2

- (a) (i) While many candidates were familiar with interpreting graphical information, this data was slightly different as it represented the balance between legal-sized and under-sized fish. This was not always appreciated by some of the weaker candidates and was reflected in the way they answered the question. When data was quoted it was given credit, provided it was accurate. Phrases such as 'nearly' or 'approximately' were not considered to be accurate enough to be credited.
- (ii) This question also proved challenging for weaker candidates, who often had difficulty in interpreting the data fully. Most identified that more under-sized fish were caught in 2020 but fewer were able to link this to the impact on future breeding success.
- (b) Most candidates attempted this question, although not all were successful in relating their answer to the specific context of the question. There was confusion in some responses over the difference between mesh size and net size.

Question 3

- (a) Candidates followed the instructions in the question and used the photograph as a stimulus. Many identified that the machine was increasing the depth of the area collecting water or increasing the height of the banks. Some incorrectly assumed the machine was scooping out the water. This was not credited as it did not answer the question.
- (b) Responses showed candidates were well prepared to provide alternative methods to reduce the impact of flooding. A wide range of examples were credited.

Section B

Question 4

- (a) (i) This calculation was completed with varying levels of success. The stronger candidates were able to determine the volume of the landfill site successfully to achieve the answer of 100.5 million. A common error was not expressing the calculation in millions.
- (ii) A more accessible calculation, this still proved challenging to some weaker candidates.
- (iii) The third calculation in this series proved to be the most accessible. Most candidates were able to use the data to derive the correct answer of 10 000.
- (b) Although many responses did not give the stages for restoration of the site in the correct order, they were still given credit. Some weaker candidates wrote about the type of facilities that would be needed in a park rather than the processes needed to restore the landfill site.
- (c) Most responses showed that candidates had read the instructions correctly and created a bar chart rather than a line graph. It was expected that candidates make use of the majority of the grid which means the choice of scale is important. Similarly, the width of bars should be consistent.
- (d) In this question, there seemed to be a good general understanding that the transportation of waste increased the risk of pollution or use of fossil fuels. Many responses could have been improved by considering the issues caused by the resultant large volume of waste in one place, and whether the recipients were able to process the waste appropriately.

Question 5

- (a) (i) Whilst a familiar topic, many weaker candidates found it challenging to be able to classify energy sources against the two criteria selected.
- (ii) Many candidates correctly identified hydroelectric as being another source of energy. Responses that stated 'water' were not given credit, as this is also involved in wave and tidal energy.
- (b) There was a general understanding of the risks that fracking may pose. Many identified the risk of seismic activity, the risk of pollution to water supplies and the impact on the local habitat.

- (c) Most candidates had some knowledge of methods of reducing the amount of oil used to fuel motor vehicles. Generalisations such as 'education' without any qualification were not credited.

Question 6

- (a) (i) This calculation question proved to be challenging to some weaker candidates who were unable to reach the answer of 44. Some candidates did not notice that the response line already contained the words 'million trees'.
- (ii) This question was well answered in general with more able candidates able to name a least two reasons. Some weaker responses suggested that forest needed to be cleared to plant the new trees; this was not given credit, although a wide range of potential ideas were creditworthy.
- (iii) Many responses showed a good understanding of the requirements plants need to grow. A common alternative answer was the lack of skill of those planting the trees or lack of suitable aftercare.
- (b) This question proved to be challenging for most candidates. Whilst some made the connection to transpiration, there was a general lack of linkage to other phases such as the impact on groundwater stores, or the reduction in infiltration rates.

Question 7

- (a) (i) This question required candidates to use the information in the map within their answers. Almost all candidates attempted the question, although some interpreted the data as relating to the increase in general population, rather than a measurement of the level of an urban population which might also be caused by migration. Responses typically were more precise in their naming of locations or regions, showing an improvement on previous years, with less use of 'above' or 'below' when relating zones linked to the Equator.
- (ii) Whilst the previous question proved to be challenging, more candidates were able to provide a good range of reasons why migration may occur.
- (iii) Candidates were often less able to clearly articulate the issues a sudden increase in population may bring. Most identified the impact on waste or water pollution and a few identified that there would be an increase in unplanned housing or the potential for unemployment.
- (b) Candidates were asked to draw a population pyramid. This was completed with varying levels of success, although many identified that the population would decrease as it aged. The most common error for the more able candidates was the omission of labelling of the axes.

Question 8

- (a) (i) A significant number of more able candidates were able to complete the calculation correctly to achieve the answer of 29, although this was not the case for many weaker candidates.
- (ii) A common error within responses was to name another bacterial disease which was excluded in the stem of the question. Many identified the risk of the water being polluted.
- (iii) The majority of candidates were able to name a suitable method of making water potable.
- (b) The six-mark, level of response question allows the candidate to write more extensively about a topic and is designed so that the answer may bring in ideas and concepts from across the syllabus. It is often the case with this style of question that the candidate needs to decide whether they agree or disagree with the statement provided. They are credited according to the quality of their response, ideally reflecting on both sides of the argument, and providing relevant examples.

In this case, candidates needed to decide whether money would be better spent on treating water-related disease or on suitable infrastructure. Among the cohort, there were some very good examples of this being achieved, including some that took the question beyond the economic argument and brought in moral questions too. Some weaker responses consisted only of a few bullet points without a clear conclusion.

ENVIRONMENTAL MANAGEMENT

Paper 0680/21
Paper 2 Management in Context

Key messages

Candidates should:

- read the whole of each question carefully to make sure that they answer the question asked; for example, when plotting graphs, check whether the type of graph, line or bar, is specified;
- know how to present graphs, bar graphs and histograms;
- use the mark allocations, shown in brackets, and the number of answer lines provided as a guide to how much needs to be written to answer each question;
- remember that answers written as bullet points should be whole sentences and not just one or two words;
- remember that not all the answers are on lines - check if answers have to be written in a table or on a diagram;
- show working when completing calculations, especially when more than one mark is available for the answer;
- look at the command word in conjunction with the mark allocation and the number of answer lines provided for a question before starting to write a response. For instance, a question asking for reasons with an allocation of three marks needs three reasons. A question with the command word 'Describe' and three marks needs at least three pieces of information.

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Spain. Many candidates understood and made good use of the source material and their written responses were clearly expressed. The mathematical and graphical questions posed some difficulties for a minority of candidates.

Candidates had no problems completing the paper in the time available.

Comments on specific questions

Question 1

- (a) Almost all candidates were able to correctly calculate the area of land used for agriculture in Spain as 272 899.8 km² or rounded up to 272 900 km². Some candidates used the wrong figures for the calculation.
- (b) Most candidates were able to explain that high temperatures and high rainfall made Spain suitable for growing vegetables. Some responses also stated that the temperature and rainfall were suitable for photosynthesis in plants. A few candidates mentioned that high rainfall allowed water to be stored for irrigation.
- (c) This question required candidates to suggest which location, Málaga or Santander, is best suited to growing vegetables and to use the data to give a reason for their answer. There were some good answers for both locations. Some candidates suggested that Málaga was best suited as it had more sunshine to ripen vegetables. Others suggested that Santander was the best location because there were more days with precipitation to provide a regular supply of water to the crops. Some candidates wrote responses that did not use the data.

- (d)(i) Most candidates correctly stated that location C is best for growing corn.
- (ii) Most candidates correctly stated that location E is best for growing flowering plants.
- (iii) Fewer candidates suggested that location F is best for building a factory. Those who did usually gave as a reason that the location has low concentrations of the three ions; nitrate, phosphate and potassium, so it is not suitable for growing crops. There were some references to factories needing high concentrations of phosphate.
- (iv) Most candidates correctly calculated 71 as the range for the concentration of potassium ions in the soils at the six locations, A, B, C, D, E and F. Some candidates identified the largest value (101) and the smallest value (30) but did not complete the calculation.
- (v) This question required candidates to calculate the average nitrate ion concentration of the soils at the six locations, A, B, C, D, E and F and give their answer to the nearest whole ppm. Many candidates calculated the average nitrate ion concentration as 26.6, 26.7 or 26.67 and needed to go on to give their answer to the nearest whole number, 27. Those who showed their working were often able to gain partial credit.
- (vi) Many candidates stated that fertilisers can improve the concentration of mineral ions in soils. Others gave as a response crop rotation or planting legumes such as peas and beans. Some candidates misread the question and gave reasons why the concentration of mineral ions is improved in soils.
- (vii) Some candidates found completing the table to describe the characteristics of sandy soil straightforward and gained full credit. Others found the question difficult and gave definitions of the three characteristics instead. There were some vague answers such as 'air is present' that could be the characteristic of any type of soil.

Question 2

- (a)(i) Many candidates suggested at least one reason why people are not allowed to walk on the sand dunes. Most of the correct answers were about people disturbing plants and animals, causing habitat loss and leaving litter. Some candidates interpreted the question as the dunes being dangerous for people and wrote about animals such as snakes and poisonous plants.
- (ii) The strongest responses suggested that the plants have roots that are adapted to growing in the sand dunes. The roots were described as long, deep or wide. Other adaptations suggested were water storage, salt tolerance and spiny or fleshy leaves. Some candidates wrote about sand dunes in hot deserts.
- (iii) There were many detailed answers explaining how climate change is a threat to the sand dunes. These included increases in temperature causing a rise in sea level which drowned the sand dunes, and extreme weather such as cyclones and storms washing or blowing the sand away. Some candidates wrote about climate affecting the ecosystems and habitats on the sand dunes; others about possible impacts of climate change more generally.
- (iv) A few candidates understood that the question was about the sustainable use of sand for future generations. Most responses were about how the removal of sand would cause loss of habitat and loss of biodiversity.
- (b)(i) Although many candidates correctly ticked T, contains fossils, and V, contains layers, as characteristics of sedimentary rocks, some selected V and not T. Some responses wrongly selected U, contains small crystals.
- (ii) This question required candidates to show by calculation why the factory can be built at location X. To answer it successfully they had to calculate the distance, on the map, of location X from the sand dune reserve. Stronger responses showed the use of the scale on the map to measure the distance from X to the sand dunes, and gave the actual distance in km. These candidates wrote a clear answer, explaining that the factory can be built at this location as it is further away from the reserve than the given distance of 3.5 km. Some candidates showed correct working but then did not compare their answer with the given distance to explain that the factory can be built. These candidates often gained some credit for correct calculation.

- (iii) Many candidates considered the fact that only women were sent questionnaires was a limitation of the method. Some considered the distance the company sends the questionnaires a limitation. Very few supported this idea with a reason such as the costs involved in collecting and processing the data.
 - (iv) Most candidates were able to explain why yes or no answers are used on questionnaires. The most common explanations were that they are easier or quicker either to answer or to analyse.
 - (v) Most candidates suggested that most local people want the factory to be built because there would be jobs available for people living nearby. Some went on to suggest that there would be improvements in the infrastructure of the area, such as roads. Others suggested that there would be more money in the area and this would improve the local economy or that taxes paid by the factory could improve the national economy. Some responses wrongly suggested that most people did not care about the sand dunes.
- (c) (i) The responses to this question, requiring the description of a method the scientist can use to determine the number of plant species along the 10-metre transect line in the sand dune reserve were variable. The stronger responses described placing quadrats (e.g. 1 × 1 metre) at regular (e.g. 50 metre) intervals along the transect line. Then, counting the number of species in each quadrat, identifying them using a book and recording the number using a tally in a table. They then stated that the method would be repeated and an average obtained. Some responses mentioned systematic sampling without further details about the method. Other responses described random sampling the reserve and the use of random number generators. Some candidates wrote about counting plants, others about species moving and the use of pooters and pitfall traps.
- (ii) Many candidates found this question challenging. Stronger responses suggested several reasons why using the data in the table is likely to give an underestimate of the total number of species in the 10 km² sand dune reserve. These included the five 10-metre transects only covering a small area of the 10 km² sand dune reserve, and some species only being found in other areas of the reserve that were not being investigated. Many candidates suggested reasons such as the plants being seasonal or animals moving away.

Question 3

- (a) (i) Most candidates gained some credit for drawing a pie chart for the data about resources used to generate electricity in Spain. Many candidates completed the pie chart by presenting the sectors in the order given in the table. Pie chart sectors should be presented in rank order, largest first, beginning at the top and proceeding clockwise. This includes other data so the row 'other renewable' should have been plotted after fossil fuel. There were few plotting errors and most candidates completed the key to match their sector shading.
- (ii) Most candidates suggested that countries import electricity because they cannot produce enough to meet demand. Some mentioned population growth and others shortage of fossil fuels or renewable resources. There were some vague answers such as, 'they do not have the resources'. A common error was confusing 'import' with 'export' and suggesting benefits such as bringing money into the country and increasing the country's GDP.
- (iii) Most candidates suggested one disadvantage of importing electricity was the high cost. Some suggested that changes in price could cost countries a lot of money. Others that being dependent on other countries for electricity is risky as the supply could be stopped.
- (iv) Most candidates had a good understanding of the advantages and disadvantages of using wind turbines to generate electricity compared with using fossil fuels, with many gaining full credit. Some responses stated that wind turbines did not cause air pollution as an advantage; this was too vague to gain credit. The gases involved, carbon dioxide (CO₂), sulfur dioxide (SO₂) and nitrogen oxides (NO_x) had to be named. The most common disadvantages were that wind power is intermittent because the turbines depend on strong wind, and that they can be noisy and cause visual pollution.
- (b) (i) The answers given to this question were variable. The stronger responses concentrated on burying and burning. These considered a range of problems; toxic leaks, different types of pollution and the

effects on people, animals and ecosystems. Some candidates gave general answers about oil pollution; others vague responses about greenhouse gases.

- (ii) Nearly all candidates were able to determine that the machine produces 900 litres of useful fuel in one day. The most common mistake was dividing 1000 by 0.9 instead of multiplying.
- (c) This question required candidates to describe strategies for the efficient management of existing energy resources. The stronger responses described ways of reducing consumption such as using energy-efficient cars or hybrid cars, switching electrical equipment off when not in use, using energy-efficient light bulbs and heating systems, insulating houses, installing double-glazing and the importance of education about energy conservation. Some candidates described strategies for the efficient management of rocks and mineral resources instead of energy.

Question 4

- (a) This question required candidates to write a conclusion for the farmer's investigation into the best diet for sheep. Many found writing a clear conclusion challenging. Some wrote a description of the information in the table, about the average mass of sheep in the fields or the average mass of sheep and the plants they grazed on. Those who wrote about the fields and the plants often did not include any details about the average mass of the sheep. The strongest answers stated that the best diet for sheep was the clover and grass in field P as the sheep in this field gained the greatest mass. Some candidates suggested that high mass is to be avoided in sheep; others that grass was the best diet for sheep to lose weight or stay healthy.
- (b) (i) There were many reasons suggested for the results shown in the table for sheep 2 and sheep 3. The data showed that these two sheep had the same mass at the start of the investigation and after the mineral block was added for one year. The most common response was that the two sheep did not lick the mineral block.
- (ii) In order to suggest whether the farmer should use a mineral block for all sheep, candidates needed to look carefully at the table. Either decision (yes or no) was valid, with credit awarded for the reason given for their decision. The stronger responses wrote their decision followed by a reason. For example, 'Yes, because four of the six sheep increased in mass' and 'No, two sheep did not increase in mass and two only increased by 2 kg.' Many responses were not creditworthy; some needed to give a decision, some needed to use the data in the table and others to give an answer that applied to all sheep.
- (iii) Nearly all candidates correctly suggested that sheep would become ill and die or stop growing if copper is included in the mineral block.
- (iv) Selective breeding was not well understood. The strongest responses showed a good understanding and described how selective breeding could be used to increase the mass of sheep. These described how a farmer could select male and female sheep with the most mass, breed them to produce big sheep, breed the largest of these sheep and keep repeating the process. Some showed an understanding of the principle and needed to go on to apply it to the situation in the question. These candidates wrote in general terms about breeding desirable characteristics. Many responses were about increasing the mass of sheep by feeding them on clover, grass and mineral blocks.
- (c) (i) Nearly all candidates correctly suggested at least two causes of deforestation other than sheep farming. The most common causes were logging, mining, settlement and infrastructure such as roads.
- (ii) This question required candidates to explain the impacts of deforestation on the carbon cycle. Many gained partial credit for explaining that deforestation increases the amount of carbon dioxide in the atmosphere because young trees remove carbon from the atmosphere and mature trees store carbon. Most then went on to explain related processes; how the build-up of carbon dioxide in the atmosphere traps heat causing the enhanced greenhouse effect, global warming and climate change, resulting in ice caps melting and sea levels increasing. These related processes were not credited. Some candidates wrote about the formation of coal. Others wrote about deforestation affecting food chains.

- (d)(i)** Most candidates suggested at least one reason for the decreasing numbers of European brown bears. Reasons credited included loss of habitat caused by deforestation, hunting and poaching, lack of food and small populations limiting opportunities for breeding. Some candidates misread the question and described the distribution of brown bears shown on the map.
- (ii)** There were many vague descriptions of how captive breeding programmes can increase the number of European brown bears. The strongest responses described how captive breeding protects the bears from hunters and ensures they are healthy because they are supplied with food and receive medical attention such as vaccination. The weakest responses referred to selective breeding, zoos and bears being 'protected' or 'cared for'.

ENVIRONMENTAL MANAGEMENT

<p>Paper 0680/22 Paper 2 Management in Context</p>
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Key messages

- Candidates are not required to state the question in their answer. For example, 'It is difficult to grow vegetables in Málaga because...'. Avoiding this repetition allows candidates to make best use of examination time.
- The mark allocation for each question should be used as a guide by candidates to indicate the number of separate marking points that are required in each response.
- The use of bullet points in responses may help candidates produce concise answers that address a sufficient number of points.

General comments

Candidates should avoid vague statements such as 'causes harm', 'causes pollution', 'affects the environment', 'causes death'; these unspecific statements are unlikely to gain credit.

Candidates should be encouraged to check their question paper to ensure they have attempted every question.

Pie charts should be drawn with a sharp pencil and ruler. The sectors should be drawn in rank order, with the largest first, beginning at the top and proceeding clockwise. The key should match the sectors in the pie chart.

It is not advisable to use pen for any diagram, graph or chart. Errors are more difficult to correct if pen is used. A ruler and sharp pencil should always be used for a graph.

A number of candidates appeared unfamiliar with pitfall traps and transects.

There were a number of part questions where no responses were given.

Comments on specific questions

Question 1

- (a) (i) Most responses correctly determined 4.2 as the percentage of the population working in the agricultural industry in 2020.
- (ii) Many candidates found it challenging to determine the expected number of people living in urban Spain using the rate of increase provided. It was common for responses to omit the use of 'million' in their final answer, e.g. '40.5 people'.
- (iii) Good suggestions for the effects of increasing urbanisation were seen. 'Deforestation' and 'a reduction in land available for food production' were common correct answers. Some candidates would have benefitted from using bullet points in their answer to ensure they gave a suitable number of effects.
- (iv) This was well answered and explanations were detailed and usually concise. Most responses recognised that safe drinking water reduces diseases and many included examples such as cholera.

- (b) (i) Many candidates were able to interpret the population pyramid successfully. Weaker responses referred to the shape without comparing the population of males and females.
- (ii) Most responses stated that a wide middle in the population pyramid indicated a large working age population and a narrow base showed a low number of children. Weaker responses focused on descriptions of the pyramid and the percentage of the population in each section rather than explaining what the shape indicated.
- (iii) Weaker answers stated the name of the type of policy rather than describing the effect on the population. Most responses stated that the population would increase. Good responses linked an increase in births to an increase in risk to overall maternal health.

Question 2

- (a) (i) Most candidates stated that precipitation is low throughout the year. Very few went on to suggest why this makes it difficult to grow vegetables and few referred to photosynthesis and an increase in the risk of drought.
 - (ii) The majority could determine the range correctly and gave the answer 121. A few weaker responses did not calculate a range and simply gave the maximum and minimum values.
 - (iii) Some candidates found this a challenging question and gave answers that were too vague to gain credit.
 - (iv) Most responses gave a correct factor. A few stated 'soil quality' which had already been given in the question.
- (b) (i) A minority incorrectly stated fertiliser 3 instead of the correct answer of 2.
 - (ii) Most candidates realised that the high percentage of nitrate and the low percentage of phosphate made fertiliser 1 unsuitable for soil B.
 - (iii) Good suggestions were generally seen. Weaker responses stated that 'no fertiliser had been added', despite the question stating that the photograph was after fertiliser addition.
 - (iv) Candidates struggled to express their answers clearly on this question and the characteristics of clay soil were not well known. Often, contradictory statements were given such as 'good draining as the soil is waterlogged'.
- (c) Most responses included some explanation of why trickle drip irrigation is efficient but relatively few gave a full response. Candidates may have benefitted from using bullet points in their response so they could clearly see the separate points they were making.
 - (d) The majority recognised that regular flooding can deposit silt onto soil and therefore increase its fertility.

Question 3

- (a) (i) Many candidates found working with the scale challenging. The weakest responses stated that the factory cannot be built at X but gave no calculation to support this statement, which had already been given in the question.
- (ii) There was a general confusion between random and systematic sampling.
- (iii) The majority could give one limitation about the questionnaire, but fewer gave two. Most repeated their first limitation using alternate wording.
- (iv) Some responses were too vague to gain credit, such as 'does it pollute?' or 'does it harm the environment?'. Examples of good responses included 'how will waste be disposed of?', and 'how will air pollution be dealt with?'. Some candidates repeated the information in the stem and stated 'report on local people's views', which was not credited.

- (b) Good responses focused on the comparative proximity of P to the salt conditions of the ocean. Weaker responses suggested that the climate would be different at Q; at a distance of less than 100 m this is very unlikely. Few suggested that vegetation at P could experience more trampling.
- (c) Some good suggestions were seen for the benefits to the town of the sand dune including 'tourism' and 'protection from waves'. Weaker responses suggested 'extraction of the sand for building' but as the sand dune is a reserve, the area is protected.

Question 4

- (a) Candidates found it challenging to suggest why there was a difference in electricity consumption and production. Good responses suggested 'to deal with surges in demand'. Weaker answers suggested 'the population had decreased'.
- (b) (i) Candidates found drawing the pie chart challenging. Many were drawn in pen and when errors were made, this made correcting those errors very difficult. Rulers were often not used. The largest sector frequently did not start at the top and sectors were not in rank order. Plotting was sometimes correct and generally the key matched the sectors.
 - (ii) This was well answered and the majority knew advantages and disadvantages of using solar energy compared with using fossil fuels.
- (c) (i) The power provided was usually correctly calculated and the answer of 2.2 was given.
 - (ii) Some vague responses were seen that simply repeated the information in the question. Good responses identified that there would be a reduction in the use of fossil fuels which would reduce the depletion of fossil fuel reserves. Some commented on a reduction in cost, without specifying what this cost was. A minority correctly referred to a reduced risk of a stated pollution effect due to waste oil disposal.
- (d) (i) There was some confusion with the remains of animals and plants being deposited on land rather than on the sea floor. A few descriptions needed to include heat as a requirement for the process. A minority of responses incorrectly referred to fractional distillation and cracking.
 - (ii) Sulfur dioxide was well known.
 - (iii) Some good explanations were seen that referred to the formation of acid rain and the transport of toxic gases via air being blown by wind.

Question 5

- (a) Two correct reasons for why land is cleared of forest were usually given. Weaker responses repeated the information in the question and stated 'for power lines'.
- (b) (i) Candidates found this challenging. Many sampled only one side of the forest. Others needed to include 10 sample sites and make correct use of the key. A large number did not use the scale.
 - (ii) Most candidates could correctly use a tally; a minority did not show 19 correctly or miscounted and gave 14.
 - (iii) A common error was to leave the answer as 11.8 and not round to two significant figures.
 - (iv) Most responses suggested that repeating with more transect lines enables an average to be determined. Vague responses referred to accuracy.
 - (v) A large number of candidates were not familiar with a limitation of using transect lines.
 - (vi) The use of pitfall traps was not well known.
- (c) (i) Many correct strategies were suggested and good explanations that supported the stated strategy were also given. Weaker responses stated 'captive breeding' as a correct strategy but then repeated this as an explanation 'to enable captive breeding'. Stronger responses suggested

captive breeding can 'increase the genetic diversity of offspring' and 'ensures the health of mother and young with good animal health care'.

- (ii) Candidates found it challenging to suggest why international agreements are needed. Good responses explained that these enable global monitoring and enforcement.

ENVIRONMENTAL MANAGEMENT

Paper 0680/23
Paper 2 Management in Context

Key messages

- Candidates are not required to state the question in their answer. For example, 'The name of the method of sampling is...' Avoiding this repetition allows candidates to make best use of examination time.
- The mark allocation for each question should be used as a guide for candidates to indicate the number of separate marking points that are required in each response.
- The use of bullet points in responses may help candidates produce concise answers that address a sufficient number of points.

General comments

Candidates should avoid vague statements such as 'causes harm', 'causes pollution', 'affects the environment', 'causes death'; these unspecific statements are unlikely to gain credit.

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It is not advisable to use pen for any diagram, graph or chart. Errors are more difficult to correct if pen is used. A ruler and sharp pencil should always be used for a graph.

There were a number of part questions where no responses were given.

Comments on specific questions

Question 1

- (a) The majority of candidates calculated the percentage of land in Spain that is covered by fresh water to achieve the correct answer of 1.26.
- (b) (i) A few responses incorrectly suggested that Santander had higher rainfall, indicating that some candidates did not recognise the term 'drought'.
- (ii) Candidates were not familiar with the link between precipitation and air pressure.
- (iii) Some responses recognised the data was not representative of the whole month. More candidates suggested that precipitation changed over the month.
- (iv) Many vague answers were seen and few candidates could fully describe the impacts of drought on soil.
- (v) Many responses were descriptions of the photograph rather than suggestions of how fire breaks control the spread of wildfire.
- (c) (i) Drawing a pie chart was challenging for many candidates. Pen was often used and this created problems when mistakes were made and errors could not be erased. Rulers were infrequently

used, few charts were in rank order with the largest sector starting at the top, sector angles were incorrect and some did not include a suitable key.

- (ii) Random sampling was not known by many candidates. A common error was to refer to 'probability sampling'.
- (iii) The limitation of sampling one area was correctly given in a minority of responses as biased or not representative, but a significant number of candidates gave the vague answer of 'lack of accuracy'.
- (iv) Most responses suggested the sea or ocean as the main source of high levels of salt in ground water.
- (v) Many answers gave descriptions of biomagnification rather than bioaccumulation.
- (vi) The majority of responses included a correct description of the distribution of poor ground water quality in Spain. Some referred to good ground water.

Question 2

- (a) (i) 'Biofuel' was a common incorrect answer for an energy source for trees.
- (ii) Some candidates believed that wood becomes steam when heated. Others stated that combustion was a product or biogas was a process. Most were able to gain some credit for the idea that steam turns the turbine.
- (iii) Identifying that a battery is portable was the most commonly seen correct response. Many vague answers were given. Repetition of the question, 'so electricity can be stored' did not gain any credit.
- (iv) Many vague responses were given. There was confusion as to whether biofuels are renewable. As both methods produce carbon dioxide this was not relevant to give as a response for an advantage of biofuels.
- (b) (i) Many correct calculations were seen; giving an answer to the nearest whole MWh was more challenging for some candidates. Answer: 892 or 889 (as 2020 was a leap year).
- (ii) This was generally well answered. Often only one valid advantage was given.
- (iii) Many answers incorrectly suggested that being closer to a power station meant there would be less chance of a loss of electricity supply, as people who live nearer a power station are prioritised over those that live further away.
- (iv) There was a good understanding of factors that must be considered before a power station can be built. 'Damage to the environment' was seen in weaker responses; an explanation of what might be damaged was required for credit to be awarded.

Question 3

- (a) (i) The majority of candidates misread the question and answered why grapes are compared between fields, rather than why only one bunch is cut per plant.
- (ii) Most averages were correctly determined to achieve the answer of 52.
- (iii) A number gave 3 or 3.2 as the pH range instead of the answer of 3.7.
- (iv) Most could identify fields A, B and D. Occasionally, B was omitted.
- (v) An ideal soil pH of between 5.8 and 6.0 was usually given.
- (vi) The majority correctly selected field A.
- (vii) Candidates were not familiar with the relative size of silt, clay and sand. Many responses gave the mineral particles as mud, dirt and rock; others referred to plants and seeds.

- (viii) Many vague answers were seen such as, 'to stop the grapes being infected'.
 - (ix) The most popular correct suggestion was a concern over safety to human health. Very few indicated concerns over loss of biodiversity or cross contamination with non-GM crops.
- (b)
- (i) Many good suggestions were seen such as 'the method is quicker' or 'the grapes are not destroyed so no loss of product'.
 - (ii) This was well known. A common correct response referred to a change in temperature making conditions more favourable for fungi growth.
 - (iii) Some candidates opted for clear descriptions such as 'surround by taller and stronger plants'. A few responses only gave one suggestion.
- (c)
- (i) Most candidates could give a correct tally of 14.
 - (ii) Candidates found this a challenging question and there were a number of no responses. In the method, many descriptions were vague and confused. Very few suggested repeating and taking a mean. For the estimation, very few could give a correct scaling up factor.
 - (iii) Sensible benefits of leaving the plants on the surface of the field after ploughing were suggested by most candidates. Often there was additional incorrect detail such as 'animals can feed on the plants'.
 - (iv) The difference between commercial and subsistence farming was known by most candidates. A minority only focused on one of these farming types and did not give a comparative answer.

Question 4

- (a)
- (i) A number of no responses were seen here. The majority who answered the question were able to give a correct fault line location.
 - (ii) Most responses correctly cited plate movement.
 - (iii) Candidates found this challenging and answers were often vague. No responses were also common.
 - (iv) Many vague answers were seen. Some candidates misinterpreted the question and described details in the table.
 - (v) This was generally well answered. Weaker responses repeated the same strategy such as 'evacuation' and 'leave the area'. Others did not give an explanation that matched the strategy they had given.
- (b)
- Most candidates suggested that the nets caught the rocks and prevented vehicles from being crushed and the road from being blocked.
- (c)
- (i) Candidates struggled with this question. The majority of correct answers described the general formation of sedimentary rocks through weathering, such as how sandstone might be formed. Many candidates indicated 'heat' was involved. Very few identified the length of time as millions of years.
 - (ii) Responses to this part were varied, with many vague answers seen. A few identified sulfur dioxide but generally its reaction with water was not described and no explanation was given. Very few answers identified depletion of minerals or nutrients from soil.