ENVIRONMENTAL MANAGEMENT

> **Paper 5014/11**
>
> **Paper 11**

Key Messages

- Read the questions carefully, read each question more than once and underline key question words, such as the command words, (the words which tell candidates what to do).

- The most ignored commands on this paper were in **5(c)(ii)**. 'Looking at the sketch' was the key instruction; also important was 'describe how'. Knowledge of traditional subsistence faming was needed, but the question required it to be applied to the example of the area shown on the sketch.

- Take careful note of the credit allocation for the question. This is increasingly important for questions with high credit allocations. To be awarded full credit, more is required than simply filling all the lines; depth and/or breadth is achieved by looking for different reasons, or by elaborating more fully, which is sometimes helped by use of an example (or examples).

- **Questions 5(a)(ii)** and **6(a)(i)**, which required descriptions of distributions from maps, were poorly answered. Some candidates did not seem to know what they were expected to do. In distribution questions, candidates need to focus upon stating where they are located, supported by named references to continents and countries (when relevant).

- When asked to give views on a topic or issue, such as in **6(c)(iv)** and **6(e)(v)**, what matters is the explanation, not the personal opinion itself. Candidates who 'sat on the fence' by referring to more than one viewpoint tended to limit the depth and value of their explanations, compared with those who concentrated on supporting one clearly expressed view.

General Comments

In *Section A* the credit awarded for **Questions 1** and **3** was higher than that for **Questions 2** and **4**. In **Question 1** many candidates only achieved minimal credit in the sections for which higher credit was available. This was mostly because their answers lacked the development needed for full credit to be awarded. In **Question 2** the average amount of credit awarded was brought down by limited candidate understanding of the importance of origins of current, for creating its characteristics and for their effects on climate. Candidates were more comfortable with the topic in **Question 3**, although many did not give full answers to all parts. The main weakness in answers to **Question 4** was a failure to refer to locations when using the photographic evidence.

In *Section B*, the credit awarded to individual candidates for **Question 5** and **Question 6** were usually similar, if not identical. It was very rare to see a real divergence between the two questions on this paper. This showed that candidates tended to carry forward the standard set in answering the first question into the second question. Papers that were incomplete or unfinished were rare, which indicates that there were no time problems. This meant that good candidates would have had time to look back, and check that their answers matched question needs, and that they had written all that they could for the credit available. Sometimes it was possible to detect answers in which supplementary information had been added later. It was also rare for questions to be left totally unanswered, which suggested good candidate familiarity with the topics being examined.

Questions which were particularly well answered by candidates were those which required a graph to be plotted, such as the divided bar graph in **3(a)(i)**, the temperature graph in **5(b)(i)** and the pie graph in **6(d)(iii)**. Other questions which were well answered included **5(d)(i)**, **6(a)(ii)** and **6(c)(ii)**. Less well answered were **4(b)**, **5(b)(iv)**, **5(d)(ii)**, and **6(d)(v)**.

Comments on Specific Questions

Section A

Question 1

Most candidates answered **(a)(i)** correctly. In most answers to **(a)(ii)** only one feature of the location was stated, such as deep underground, or within one rock layer. Two descriptions such as these were needed for full credit to be awarded. Part **(a)(iii)** gave candidates an opportunity to explain the dangers of nuclear waste which make it necessary to store it in places where it can least affect people, the environment and water sources. Having started on the right lines, many candidates failed to develop their answers sufficiently to earn full credit. The reason why nuclear power stations should not be built near plate boundaries was well known in **(b)**. Candidates who clearly recognised that winds in the atmosphere, rivers and ocean currents are links between different countries answered part **(c)** the best. Many concentrated on only one of these links, which limited the amount of elaboration they provided.

Question 2

The strongest answers to parts **(a)(i)** and **(ii)** came from candidates who based their answers upon the origins of the ocean currents. These candidates could then explain why the Gulf Stream, with its origin in warm tropical waters, is a warm current, and why some cold currents, such as the East Greenland Current, are colder than other cold currents. Answers to **(a)(iii)** revealed limited candidate understanding of the effects of ocean current on climate, with the correct answer, **T**, the least popular choice. Answers to part **(b)** tended to be either all correct or all incorrect. Placing the word 'cooled' into the first space almost invariably led to the correct placing of 'condensation' and 'decreases'. In **(c)(i)**, realising that the warm waters of the Gulf Stream would allow fishing in ice-free waters in winter further north than off Greenland, was appreciated by only a minority of candidates. Better answered was **(c)(ii)**. The general circulation of ocean currents in the Atlantic Ocean which allowed the movement of waste was well recognised, although not all candidates supported their answers by more detailed references to individual currents and their flows.

Question 3

Most divided bars were completed correctly in **(a)(i)**. In **(a)(ii)**, although it was possible to use the higher production in 2010 compared with 2000 over the whole time period, most candidates preferred to choose a shorter time frame. Most popular was comparing 2000 with the peak year of 2008. When supported by the use of values, full credit could be awarded. Sustained increases in agricultural production, the theme of **(a)(iii)**, can only result from human factors. Those candidates who tried to explain using physical factors struggled, because physical factors can be better used to explain fluctuations from year to year, and not longer term trends. Irrigation was mentioned more often than higher yielding varieties of seeds and more widespread knowledge of improved farming techniques among farmers in the developing world. Many candidates gave insufficient content. The year 2003 was the most popular choice in **(a)(iv)**. Most answers to part **(b)** were based on market price changes. Referred to less often were variations in supply and the needs of the domestic market.

Question 4

The credit awarded for **(a)** depended on the detail given in descriptions of the vegetation shown in the photograph. The best descriptions included references to the photograph location, emphasising differences between the detailed view of the trees and grasses in the foreground and the lower slopes covered by coniferous forest in the background. The strongest answers in **(b)** came from those who related individual coniferous tree characteristics to climate, such as thick bark to protect from the cold and a conical shape to allow snow to slide off. In many answers the references to climate were insufficiently strong to allow these relationships to be fully established. Many of the answers to **(c)(i)** lacked the precision on location that was required. Likewise in **(c)(ii)**, many candidates were reluctant to make specific references to photograph locations, which limited the amount of credit that could be awarded. The obvious area on which to focus were the bare mountain tops for which it could reasonably be suggested that the climate is too cold, as well as the land being too steep and without soil cover, for much vegetation to grow.

Section B

Question 5

Almost all candidates answered **(a)(i)** correctly. In **(a)(ii)** instead of describing the 'main features of the distribution' of savanna vegetation from the map, a significant number of candidates described the 'main features of savanna vegetation', for which no credit could be awarded. Those who did answer the question had few problems earning credit for within the tropics, even if they did not look for additional descriptive details such as on both sides of the Equator in South America and Africa, or across the Equator in Africa. In **(a)(iii)** some candidates lost credit because they named a different type of vegetation in **B** from that named in **A**.

Most candidates scored full credit in **(b)(i)**. The best finished graphs were drawn by candidates who chose a scale of 1 °C for one small square, and placed their dots in the centre of the column for each month. Neither of these were absolute essentials as accuracy was the important factor. Thus all graphs were marked on the basis of the candidate's own marked scale. Failure to mark the scale, which sometimes happened, meant that the credit available for plotting could not be awarded. Despite the question instruction, and the convention that temperature is always displayed in a line graph (because it is showing continuous data), some candidates drew bar graphs. The correct answer of 97 per cent was the one most commonly circled in part **(ii)**. The candidate needed to focus on high temperatures in **(b)(iii)**. Rainfall alone cannot be used to indicate that a climate is tropical. The majority of answers included both temperature and rainfall but needed to start with temperature in order to earn credit. The climate theme was continued in many of the answers given to **(b)(iv)**, sometimes without any reference to natural vegetation. In other answers references were to crops not natural vegetation. Only a minority of candidates, therefore, focused entirely on the requirements of the question. Answers based on differences in the colour of the vegetation between the two seasons were the most common. Many were worth only minimal credit due to lack of breadth. The best answers were those which also referred either to grass height or to trees with and without their leaves. Differences in opportunities for farming between wet and dry seasons was the starting point for most answers to **(b)(v)**. Some made good use of the earlier 97 per cent answer for rainfall concentration in the wet season. Those candidates who also included valid references to temperature in their answers, either favourable (high enough for crop growing all year) or unfavourable (high rates of evaporation in the dry season) were the ones most likely to be awarded full credit.

Growing crops and keeping livestock was the expected answer in **(c)(i)**. As always, all valid alternatives were accepted, with arable and pastoral a common answer. Cultivation was allowed as an alternative for crop growing, but broader terms such as 'farming' and 'agriculture' were not, even though it was likely that many candidates were referring to crop growing. 'Looking at the sketch' was the all-important instruction in **(c)(ii)**. Those who based their answers entirely around describing what they could see on the sketch were generally awarded full credit for describing the land uses and human activities shown. At the other end of the spectrum, some candidates accurately described characteristics of traditional subsistence farming entirely from knowledge, without any reference to the sketch. In between these two extremes were many part descriptive answers, occasionally over-reliant on stating what was not there. In comparison, part **(c)(iii)** was consistently well answered, with frequent references to the use of machinery and irrigation, as well as to grazing areas fenced off and modern buildings for farm storage.

In contrast to the answers to **(c)(ii)** the sketch was universally used for answering **(d)(i)**. Many of the answers seen were worth more than the available credit, because most candidates both stated evidence and commented on its significance as a cause of soil erosion. Typical answers included more than two pieces of evidence for high soil erosion risk from the sketch. Less well answered was **(d)(ii)**. Most began with **D** tree planting, which was the best known of the four strategies. Further credit was available for a full and precise answer covering a range of risk reducing factors such as interception, roots holding together the soil, and shelter from strong winds and heavy rain; unfortunately many candidates stopped after having described just one of these. The characteristics of the other three stated strategies were little known. Many candidates tried unsuccessfully to state what they thought they meant from the headings provided. For example, **E** dry land farming answers were often about irrigation, which this style of farming tries to avoid as much as possible. Part **(d)(iii)** was also well answered; many candidates made two or more suggestions of difficulties valid for the type of area shown on the sketch. Most used what could be seen on the sketch as their starting point, which meant that their answers were firmly based on the question requirement. Part **(d)(iv)** discriminated between candidates according the number and variety of reasons they gave. Although relatively few candidates referred to examples in their answers, able candidates commented on such a wide range of reasons that their answers went beyond the minimum needed for full credit. Weaker candidates tended to base their answers around just one or two reasons; the ones seen most often were that children

were needed as workers on farms, and the lack of family planning (due to factors such as cost, non-availability and lack of education).

The space for showing the mean of 188 mm on the graph was restricted because it needed to be marked in carefully when answering **(e)(i)**. An answer within the range 315 mm and 325 mm was accepted for **(e)(ii)**. Candidates often placed marks on the graph from the highest and lowest values to the scale. Where this was done and both values interpreted correctly, there was little chance of an answer outside the accepted range being given. In **(e)(iii)** most candidates scored partial credit. Typically credit was given for problems for farmers from flooding in very wet months, and for problems with food supplies in very dry months. Candidates who noted the credit allocation for this question elaborated further on the problems caused by living in an area of unpredictable rainfall, especially if dry or wet Aprils occur in successive years.

Most candidates earned credit throughout **Question 5** with only occasional significant losses, which were either for not making full use of the sketch in **(b)**, or for not having the knowledge and understanding to answer the parts requiring longer answers, such as **(d)(ii)**, **(d)(iv)** and **(e)(iii)**, with the detail expected.

Question 6

Most candidates scored partial credit in part **(a)(i)**. This was usually gained for giving some indication of the overall distribution of plate boundaries along the western and eastern edges of the Pacific Ocean, even if the statement made was less precise than this. Only a few candidates looked for more detailed references to locations, such as passing through the island chains off Asia or absent from the west coast of North America, in order to earn further credit for describing the distribution. What was happening to the plates at destructive plate boundaries was well known in **(a)(ii)**. Correct references to the heavier oceanic plate sinking below the lighter continental plate, and being destroyed in the subduction zone, were frequent.

Candidates who were systematic in their approach to answering, and dealt separately with 'Ring' and 'Fire', gave the best answers to **(b)(i)**. In other responses the circular 'ring' like distribution was addressed more effectively than the 'fire' element in the label. Some candidates just gave a passing mention of the presence of volcanoes as explanation. Part **(b)(ii)** was less well answered than part **(a)(ii)** had been, despite being so closely related. There was more confusion between what happens at constructive and destructive boundaries in terms of volcano formation. Only a minority of candidates stated clearly that the melting of the oceanic plate due to its destruction in the subduction zone was the source of the magma. Despite this, credit was awarded for magma being forced up through a vent to the surface, and for lava and other erupted materials building up over time to form a volcanic cone on the surface.

Smoke, ash, rocks and gases were all needed for credit in part **(c)(i)**. Most candidates gave all four, although some listed other named gases associated with volcanic eruptions, but not named in the information here. Authorities evacuating people to shelters in safe areas was the reason referred to most in **(c)(ii)**. Otherwise candidates adopted different approaches. Some successfully concentrated on monitoring of the volcanoes, some on the experience gained from previous volcanic eruptions and others on the likely low population densities. A majority of candidates put forward at least two different reasons. Answers to part **(c)(iii)** varied more in quality. Prevailing westerly winds were the key to the explanation here. Also relevant were the huge size of the ash cloud, and the great height to which it had been pushed into the atmosphere. Some answers were confined to description only of the effects in other countries; these answers were more appropriate to the next part of the question, because they lacked focus on explanation of 'why' the effects were international. Those candidates who concentrated solely on economic effects in their answers to **(c)(iv)** gave the most successful answers. Many put forward convincing cases for Chile having suffered the most economically, while others used the information about Argentina and Australia to argue equally well that these countries suffered more than Chile. The weakest answers were entirely or partly about social effects such as health. A few candidates did little more than repeat the key sentence from the information starting with 'Levels of air pollution were high...' without any further explanation in **(c)(v)**. In the best answers candidates tried to separate the likely causes for sore eyes and skin, (such as from the sulfur dioxide), from those for breathing problems, (such as clouds of ash, dust and smoke).

In **(d)(i)** the tick needed to be placed in the box for 3 or any lower point on the pH scale to indicate acid soil. Fewer candidates gained credit here than in **(d)(iv)** where a point on the scale between 5 and 8 was accepted. In fact, most candidates ticked a pH of 7. Dangers of another eruption was the most chosen reason in answers to **(d)(ii)**. Plenty of other reasons were also used, and a high proportion of the answers were sufficiently well explained to be awarded full credit. Only those candidates who continued with the theme of acid soils, despite the clear instruction to find 'another' reason, failed to earn any credit. The pie graph in part **(iii)** was accurately completed by most candidates. The most repeated mistake was to plot 40%, 30% and 30%. The most effective completed keys were the ones in which the shading used on the pie

graph was placed within labelled boxes. How well a candidate understood what was meant by texture determined the quality of the answer given to **(d)(v)**. Having noted the well balanced nature of the three components, candidates who understood examined the individual characteristics of sand, clay and silt to show how well they complemented one another.

There were wide variations between how well the information in the stem of this question was selected and used to answer the first four parts of **(e)**. Those who did little more than state one or two relevant pieces of information in **(e)(i)** did less well than those who tried to explain their significance to the question. The great majority of candidates correctly circled 60% in **(e)(ii)**. Part **(e)(iii)** was a good discriminator between strong and weak candidates. The best answer needed two parts to it: that 60% of the country's population live in Java, yet the island is only 7% of the total area of Indonesia. Stating only one of the percentages without the other gave a much weaker answer. Alternatively, Java's stated high density of population could be used as the basis for answering. In this case the challenge was to explain that it was extraordinarily high. The answer in **(e)(iv)** was 11 per 1000 (or 1.1% as some answered). Whether this answer was given or not depended upon the candidate knowing what was meant by natural increase. The final question, **(e)(v)**, was another example where many candidates scored only partial credit, and only a few gained full credit. Many candidates gave reasons only for the choice made, whereas in most of the higher scoring answers candidates also explained why they thought their chosen way was superior to the other two. In weak answers, worth only minimal credit, candidates added only a little to that already given to them.

Candidates accumulated credit throughout **Question 6**. The level of credit was mainly a reflection of how consistently individual candidates accumulated credit. Perhaps the most testing question was **6(d)(v)** with its great reliance on candidates' understanding of the term soil 'texture'.

ENVIRONMENTAL MANAGEMENT

Key Messages

● Read the questions carefully, read each question more than once and underline key question words, such as the command words, (the words which tell candidates what to do).

● Many candidates did not take note of the word 'governments' in **1(c)** and gave general answers about how the environment can be protected. 'Look at the photograph' in **4(a)** was ignored by some.

● Take careful note of the credit allocation for the question. This is increasingly important for questions with high credit allocations. To be awarded full credit, more is required than simply filling all the lines; depth and/or breadth is achieved by looking for different reasons, or by elaborating more fully, which is sometimes helped by use of an example (or examples).

General Comments

Some candidates scored higher in total on *Section A* than in each of **Questions 5** and **6**. On average, **Questions 1** and **3** scored higher than **Questions 2** and **4**. Despite the two topics examined being so different, most candidates scored about the same for each of **Questions 5** and **6**. This meant that the standard set in answering the first question was carried forward into the second. Even when a candidate did show a marked preference for one of the two questions, it was as likely to be for **Question 6** as for **Question 5**. Pressure of time to complete the paper was an issue for some candidates, who could have planned their time better. Candidates should be encouraged to spend no more than 45 minutes answering *Section A*, and no more than 45 minutes answering **Question 5**, to leave 45 minutes for completing **Question 6**. Only then can they do full justice to their knowledge and understanding in answers to **Question 6**.

Questions which discriminated well between more and less able candidates were **5(b)(iii)**, **5(e)(i)** and **(ii)** and **6(a)(ii)**. These questions gave able candidates the opportunity to make the most of their knowledge and understanding, while not denying access and credit to less able candidates.

Questions which were consistently well answered were those involving the use of practical skills such as shading the world map in **5(a)(iii)** and drawing the pie graph in **5(c)(i)**. Written questions for which consistently good marks were achieved included **1(b)**, all the parts of **5(c)**, **6(b)(iii)** and **(iv)**, **6(d)(ii)** and **(e)**. Among the more difficult questions for candidates were **5(a)(iv)** and **6(b)(i)**.

Comments on Specific Questions

Section A

Question 1

Most candidates began well by identifying scrap aluminium and energy as the two inputs in **(a)(i)** and by referring to less energy use as the advantage of recycling in **(a)(ii)**. Part **(b)** was also well answered, with most candidates giving a range of different ways, including emissions into the atmosphere, liquid wastes polluting water courses, and solid waste dumps polluting the surface and contaminating water supplies. Full answers were given, some of which more than met the requirements of this question. Part **(c)** was well answered only by those candidates who focused on what 'governments' can do to improve environmental protection from industries, such as by regulation, monitoring, and prosecution of offenders. From others, there were many lengthy answers about what industries can do, particularly about how the adverse atmospheric effects of coal burning can be reduced. These could not be credited because of the lack of reference to governments and their role. Despite this, **Question 1** was overall a high scoring question.

Question 2

Completing the bar graph in **(a)(i)** was not as easy as most bar graph completion questions. On the scale given for this graph, plotting 50.4% for bare fallow was hardly any different from plotting 50%. Most candidates brought their shading too high, going up to at least 51%, while some shaded the top of the bar at 54%. In **(a)(ii)** candidates needed to be aware of two different ways in which trees and other vegetation intercept or slow down the surface movement of water; most managed this. Good answers to **(a)(iii)** concentrated on positive comparisons between trees and grass. Some answers focused relevantly on either trees or grass, without mention of both for a complete explanation, and so were only awarded partial credit. Answers to **(a)(iv)** were expressed in many different ways. They were marked on candidates' understanding that wheat is a seasonal crop, not present all year, as well as having variations in size during the growing season. One of these three statements was usually sufficient for credit to be awarded. The best, and almost universal, choice in **(b)** was bare fallow in area 4. Among the soil conservation measures referred to, contour ploughing and terracing were the best known. Many answers to this part only achieved partial credit, because the remainder of the answer was about planting trees. Since bare fallow is a land use in areas of cultivation, planting trees was only relevant in this context, such as by reference to windbreaks or to tree crops. Choices of land uses other than bare fallow were marked on their merits.

Question 3

Most candidates easily scored minimal credit in **(a)(i)**; some more precise description about location from the map was needed for further credit to be awarded. The basic answer of hot and wet all year in **(a)(ii)** needed to be supported by at least one reference to temperature and/or rainfall values for the full credit to be claimed. Most candidates realised what was needed for a good answer to **(b)(i)**. There were many references to forest burning releasing carbon dioxide, a greenhouse gas, as well as to the natural tropical rain forest being a larger carbon store than palm oil plantations. Many candidates were awarded full credit. Part **(b)(ii)** could be answered either by quoting tonnages from the graph, or by a statement to the effect that the natural rain forest stored about three times as much carbon. Loss of habitats for a member of WWF and loss of forest for food and other needs for local people were the two most common answers to **(b)(iii)**, which was also well answered.

Question 4

By looking carefully at the photograph in **(a)**, and describing the savanna vegetation present in this area, it was easy for candidates to earn full credit. Only short statements were needed, such as mainly grass, much dry grass and bare ground in the foreground, trees and bushes in the background, presence of an acacia tree, and many more. Some candidates, however, tried to rely more upon their knowledge of savanna vegetation, and referred to tall grasses and baobab trees, as well as to reasons for growth in a savanna climate. Thus poor question technique caused some candidates to lose credit. All the four terms named in **(b)** were well known. Again, those candidates who obeyed the question instruction to use the photograph were the ones most likely to give accurate answers. References to the deer shown in the photograph helped candidates to explain what was meant by population, habitat and consumer. In stating what the terms meant, certain words were critical. For example, population is the total of the 'same species', and an ecosystem is the 'interaction' between plants/animals and the natural environment. Many answers to **(c)** were a mixture of positive and negative effects, such as destruction by trampling and by eating young shoots, help by fertilising the soil and spreading seeds. Most candidates made progress without necessarily giving the breadth or depth needed for full credit to be awarded.

Section B

Question 5

Almost all candidates answered **(a)(i)** and **(ii)** correctly. Most understood what needed to be done in **(a)(iii)** and many were awarded full credit for both accurate plots and good visual appearance between continents with low and high average incomes per head. If there was a plotting mistake on the map, it was often that only that part of Asia south of the North-South divide was shaded in. A good appearance was created by candidates who acted on the question instruction to use 'denser shading or stronger colours for the high values'. More able candidates made the best progress in **(a)(iv)**. For 1, the values and map showed really good fits between North America and Latin America, and between Europe and Africa, because of the big differences in average incomes between adjacent continents. For 2, the fit within Asia was less good; here the line splits the continent in half, and included some quite rich countries in the Middle East on the south (poorer) side of the line. For 3, the question was more open and answers were more varied. Most were of

some relevance. Most candidates scored partial credit for this question, which indicated some understanding of the question requirements.

In **(b)(i)** the only acceptable answer was average income per head. Almost as popular an answer was 'Japan' instead of one of the five measures, perhaps because it was the country which had the highest income per head. The best answers to **(b)(ii)** were given by candidates who mentioned one or more of the water-borne diseases such as diarrhoea, typhoid and cholera, since these are spread as a result of contaminated drinking water. Those who tried to base their answers around water-based diseases, notably malaria, fared less well due to lack of relevance to the question set. **Question (b)(iii)** produced the biggest range in answer quality of any question on the paper. Some candidates gave high quality answers, displaying real understanding, based on variations in income per head in the four Asian countries. These candidates highlighted where they supported the line (between Japan and China) and where they did not (between Russia and South Korea). Other measures were used as well to support this, but only where relevant. Some less able candidates gave answers in which reference was made to three or more of the other non-income measures, which usually led to confused and muddled answers. In between were many answers that scored partial credit, generally for commenting either on the good fit between Japan and China, or the less good fit between Russia and South Korea, but not on both.

The pie graph was almost invariably completed accurately in **(c)(i)**, even though a few candidates failed to fill the boxes in the key. Those, who understood that the graph showed that 90% of the money went to developed countries and/or only 10% to developing countries, gave the clearest answers to **(c)(ii)**. Answers about the advantages of guaranteed and stable prices for banana farmers were needed in **(c)(iii)**, compared with references to either improved sanitation or community canteens (or both) and their advantages for the community's quality of life needed in **(c)(iv)**. Although some candidates gave the same or similar answers to both, most candidates managed to select the information relevant to each one from the comments, and answered both questions well. Only minimal credit was awarded to most candidates for their answers to **(c)(v)**, usually for reference to lower profits. Further credit was awarded to candidates who looked for another reason. Small outputs and less reliable quality were the two other reasons most used.

Food, non-governmental and governmental types of aid were the three answers for **A**, **B** and **C** in part **(d)(i)**. In **(d)(ii)** the answers were short-term, long-term and long-term. In **(d)(iii)** only the first two answers were marked, unsustainable in **A** and sustainable in **B**. Most candidates scored most or all of the available credit, which showed good levels of understanding about the nature of different types of aid. The candidate's own answer for **C** of sustainable or unsustainable was the one marked in **(d)(iv)**. Many of the candidates who chose unsustainable tended to give narrow answers which referred only to the construction phase. In stronger answers candidates also referred to reduced effectiveness with time, such as silting up behind the dam and loss of silt on the farmland below the dam. Those who chose sustainable tended to base their answers on water store and/or energy for the long-term. How well the basic idea was elaborated upon determined whether full credit was awarded. Advantages and disadvantages were equally well known in **(d)(iv)**. The two ideas referred to most were relief of suffering after a natural disaster (however expressed) and aid dependency. References to others were plentiful; candidates who noted the credit allocation for the question and kept looking for more points until they reached four gave the best answers.

The key to achieving full credit in **(e)(ii)** was a good choice of country or area in **(e)(i)**, for which the candidate was able to state places, name specific tourist attractions and show awareness of management. Sometimes it was the candidate's own country, or a location within it, which allowed enough information of a precise nature to be included for a full credit. Sometimes the choice was too narrow, such as just the Taj Mahal, which made it more difficult to generate a high scoring answer, despite it being an appropriate choice for the two question themes. Some answers were unbalanced, stronger on tourist attractions than management, or vice versa. These answers could still score well because only minimal credit was retained for each question theme. For tourist locations outside their home country, popular choices were Kenya, Thailand and islands in the Indian Ocean, particularly the Maldives. Following on from a good choice of location, full or almost full credit was quite common. All credit was not automatically lost for less appropriate choices of location, either too big such as Africa, or from a developed country such as Australia. Partial credit could still be earned, usually for sensible references about tourist management, such as ecotourism initiatives, of significance worldwide.

Candidates were awarded credit throughout all parts of the question. Part **(b)** proved to be a little more difficult than **(c)**. Otherwise an even performance was what mattered most.

Question 6

Cyclone, drought and flood were the climatic hazards in **(a)(i)**, while earthquake and volcano were the two that were tectonic. On the rare occasions when the lists were wrong, flood was the most likely hazard to be included under tectonic. In **(a)(ii)** the best answers came from candidates who concentrated on trying to give definitions, and were able to do so. All of the five hazards seemed to be well known, and equally familiar to candidates. Some candidates focused more on causes or effects; most clearly understood what the hazard was, without actually stating a definition. For marking purposes, a certain amount of 'give' and 'take' between answers was allowed, so that part credit was given for answers showing knowledge without being actual definitions. Partial credit was most commonly awarded. The question discriminated well since it was more able candidates who gained the highest credit. Volcanoes proved to be a good candidate choice in **(a)(iii)**. Candidates were able to describe a wider range of ways, more fully, for predicting their occurrence than for the second most popular choice, cyclones. References to using weather satellites to track cyclones over the sea, well before hitting land, thus allowing time in advance for evacuation to shelters, were given by only a few of those who made this choice. Most drought and flood answers were less successful because they lacked adequate references to weather forecasting. The choice of earthquakes made it impossible for the candidate to answer the question. One widespread misinterpretation among the latter group of candidates was that seismographs predict earthquakes, whereas all they do is register the magnitude of movement as it occurs. In **(a)(iv)** the choice of earthquake was credited since it was so obviously the best choice. Some candidates essentially did no more than repeat the words in the question as explanation; something extra about plate movement was needed for full credit.

Accurately completing the divided bar graphs in **(b)(i)** proved to be more challenging for candidates than shading the world map and drawing the pie graph had been. Some drew two separate bars within each divided bar, which was not credited; it was possible still to earn credit for completing the key correctly. Others plotted 90% and 98% correctly without realising that the remaining percentages were for developed countries. Usually they shaded each graph differently, because essentially they were drawing two non-divided bar graphs. This meant that they were unable to complete the key. Others, who knew what to do, found drawing the divided bars a quick and easy task. In part **(ii)**, because candidates were not restricted by the wording of the question to the five natural hazards listed in earlier parts of the question, tsunami was as acceptable an answer as cyclone for the first natural hazard in the box. The best answers to the next two were earthquake and drought in that order. Quite a number of candidates inserted flood for one or more of the answers, but this was not the best choice for any of the three when all the methods of preparation stated were taken into account. In most answers to part **(b)(iii)** poverty, either directly stated or inferred, was the underlying reason, while the attitude of the government and authorities was also regularly referred to. Candidates tended to refer both to poor preparation in advance and inadequate response in the aftermath. Virtually all candidates managed to gain at least partial credit; it was those who took note of the credit allocation by elaborating and explaining more fully who scored highest. These candidates often gave specific examples of preparations made in advance in known hazard regions, such as how to make buildings more earthquake proof. Question needs in part **(b)(iv)** were well understood, which made it one of the best answered questions, particularly by candidates who based their answers on people living close to active volcanoes. Many gave precise answers, based on fertile soils, but in addition with frequent references to other economic opportunities, such as for minerals, energy and tourism.

To be awarded credit for **(c)(i)** candidates needed to do more than state what '1 in 100' years meant; they had to go back to the stem of the question at the top of the page to make use of the information about the last flood of equivalent size. That was in the 1920s, almost one hundred years ago. Those who sought their answers from the map answered **(c)(ii)** well; those who tried to use information from the written introduction of the question at the top of the page, answered it badly. The initial credit for distribution was around the sides of the River Indus, typically followed by references to it extending the full length of the country (however expressed). These two points were made by the majority of candidates. Finding a third descriptive point about distribution proved to be more difficult. Some did it by using the key to estimate the general width of the area affected (for example, 200 km or more wide); others did it by describing the locations of areas unaffected in the north east or south west. The best answers to **(c)(iii)** were the ones based on the tremendous amount of rain that had fallen in the mountains of the north, such that the Indus was still in flood 1000 km further south. Those who gave narrow answers only about the Sindh or deserts missed the point of the question. In **(c)(iv)** answers addressed the large number affected better than why few lost their lives. Most showed little awareness that this flood was such a major event, that it takes time for flood waters to make their way downstream, so that people could not fail to hear about it (even in remote rural areas) and would have had time to get out of the way. What candidates did realise was that people in rural areas could do nothing to stop the waters flooding houses and cropland and causing damage on a massive scale.

Those who gave examples of immediate effects such as loss of crops, or destruction of farmland by mud and stones were awarded credit in **(d)(i)**. Answers referring to transport and disease could not be credited because the question asked for effects on 'cropland'. The most obvious long-term effects were layers of fertile silt deposited and underground water stores filled. Mention of one of these gained further credit. In **(d)(ii)**, information from the report strongly supported the answer of there being only a low chance of getting out of the poverty cycle, such was the scale of the losses and destruction among poor farmers 'with little before the flood' and 'nothing after it'. When this was the chosen line of answering, how well and fully the candidate answered determined how much credit was awarded. Many answers were from candidates who understood well enough, but who did not seek to give their answer extra breadth or depth. A considerable minority took the view that in future more fertile soils and refilled water stores would allow escape from the poverty trap. With this approach, it was less easy to gain high credit, mainly because it ignored the massive immediate problems widely covered in the report. For some candidates mixing these two approaches to answering worked well.

Candidates were free to refer to any natural hazards in their answers to part **(e)**. In practice, most followed the order of the question and referred to earthquakes first, followed by drought. The needs of this question were well understood. Most candidates made enough progress to earn at least partial credit by referring to the serious effects of earthquakes in urban areas and of drought in rural areas. Those who earned higher credit also tried to explain how/why rural areas were different from urban areas for loss of life from earthquakes, and how/why water and food supplies were different and more assured in urban areas during times of drought. In other words, they gave fuller and more effective answers.

Most candidates finished off the final two parts of **Question 6** with some of their stronger answers. The topic matter was familiar throughout.

ENVIRONMENTAL MANAGEMENT

Key Messages

Centres should work through past papers to help candidates see how to make the best use of the information given for each question.

General Comments

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)   Most candidates understood the term 'wide industrial base'.

(b)   There were many detailed descriptions of the graph that gained full credit.

(c) (i)   Most candidates suggested that yields would improve, but the other marking points were rarely given.

(ii)   The most common answer commented on the loss of biodiversity; all the other marking points could be related to this suggestion but only a small number of candidates went on to give any further explanation.

(iii)   There were references to 'superweeds' and loss of varieties of crops. However, the concept of genetic resistance to 'round up' being passed by pollination onto other species was only suggested by a very small number of candidates.

(d) (i)   Most candidates suggested two appropriate factors to be kept the same.

(ii)   Most graphs were well plotted with both axes labelled. There are still a significant number of candidates who do not label both axes and therefore limit the amount of credit that can be awarded.

(iii)   The decisions about the effect of urea on plant growth and the descriptions from the graph were usually very good.

(e) (i)   Most candidates realised that the plants would be absorbing phosphate, but there were some statements that were too ambiguous to gain credit.

(ii)   The majority of candidates made the correct choice of locations.

(iii)   The sequence of events leading to eutrophication was well described by most candidates. Some candidates suggested, incorrectly, that plants used up oxygen whilst still alive. The decomposition of dead algae by bacteria leading to oxygen depletion was fully described by a significant number of candidates. Maximum credit was often awarded.

(f) (i)   The majority of candidates provided correct calculations and a final answer.

(ii)   Most candidates gave creditable answers as to why growing the same crop year after year leads to reduced yields.

(iii)   Nearly all the candidates gave a correct answer, crop rotation being the most common.

(g)   Most candidates answered the question by expressing a view that production would either increase or decrease. The source information was sufficient for candidates to explain their point of view and all the marking points were seen regularly. Only a small number of candidates gave answers without any clear decision as to whether they thought it would increase or decrease; some credit was awarded for clear statements but the maximum credit could only be awarded to candidates with a clear line of argument.

Question 2

(a)   There were many answers that could not be given credit as they either just repeated information given in the question or made statements that contradicted information given. Many recognised that the oil from soy was a renewable fuel, however, only a small number developed their answer further.

(b)(i)   The calculation was correctly completed by many candidates.

(ii)   A minority of candidates suggested that the differences might be linked to the economic status of a district and the age of the cars.

(iii)   Ways in which the sampling could have been improved were clearly stated and many candidates gained full credit.

(c)(i)   The table was completed successfully by nearly all the candidates.

(ii)   This question required some thought about the details of the method as given in the question. The detail that was missing related to the boxes, and a significant minority of candidates made correct suggestions.

(iii)   The correct answer was nearly always given.

(iv)   This question was demanding, and it was hoped that candidates would think about experimental error; some did, but the majority just described the two surveys which did not answer the question.

(d)(i)   Most candidates correctly suggested that there were more particles in April.

(ii)   The differences in climate between April and November were carefully described by a minority of candidates. Most either thought that the climate was similar, or made vague statements. Candidates who quoted the values from the table generally received more credit.

(iii)   It was rare to see a temperature inversion either stated or described. Some candidates seemed to answer the question in the context of the climate in their country, rather than that given.

(e)(i)   Most candidates readily identified the interests of the farmers, however, they often failed to suggest a convincing reason for the city residents' response.

(ii)   The questions were often well laid out but candidates did not use their knowledge of renewable energy sources to any great extent. A small number of candidates only provided further questions about the use of cars.

(f)   The full range of answers were seen. Some were excellent and easily gained full credit. Most answers had some creditworthy points.

ENVIRONMENTAL MANAGEMENT

<div style="border:1px solid">

Paper 5014/22

Alternative to Coursework

</div>

Key Messages

Centres should work through past papers to help candidates see how to make the best use of the information given for each question.

General Comments

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) The majority of candidates earned full credit for this question, with the most common answers relating to low cost and the ability to carry bulky goods.

(b)(i) Most candidates were able to do this calculation.

(ii) Many candidates answered this correctly, although a minority gave too many or too few zeros.

(c)(i) Very few candidates understood this question, and there seemed to be little appreciation that lead was harmful to human health. Many referred incorrectly to adults having better immunity. More worryingly a significant number thought that as adults are bigger they need more lead in their bodies.

(ii) This was well answered by most candidates.

(iii) This was a demanding question and many simply repeated their answer to **1(c)(ii)**. A few suggested that the very young had more exposure to lead. The idea that lead pollution might have got worse was not expressed.

(d)(i) A large number of answers were too vague to gain credit. It was often suggested that all the population should be used. However, a sample must be only a portion of a whole population. More able candidates usually commented on using children of all ages from all areas of the district.

(ii) Most candidates were able to state that the concentration of lead in the blood of children living in district **1** was higher than in district **2** or district **3**. However, very few went on to expand their answer with careful use of the data.

(iii) Candidates who carefully considered the source information were able to earn full credit. The most common ideas related to lead-free petrol, non-lead water pipes and various comments about controls on dumping waste.

(e) Very few candidates realised that dogs could be used as an early warning system, as they would suffer from lead poisoning before humans.

(f)(i) Most candidates asked questions about the number and ages of children, with fewer mentioning the local industries or health issues.

(ii) The responses to this question showed that many candidates have not been taught about how a questionnaire could be successfully designed and used. Only a small number of candidates gained full credit.

(g)(i) The vast majority gave the need to dispose of wastes as the main reason for the location of tanneries. Few stated the need for washing the skins, and some thought that the location was necessary for the cattle to drink.

(ii) The point of highest pollution had to be downstream of the tanneries. Many candidates put an **X** in the waterway but in the wrong section; others placed their **X** on land.

(h)(i) Most correctly gave the high rainfall as the reason for flooding. However, it was rare to see any of the other points in the mark scheme.

(ii) This question was generally well answered, although a significant number seemed to think that farming happens in shanty towns.

(iii) This was a demanding question requiring thought about the source information, followed by sensible suggestions about the factors used to select shanty towns for improvement. As expected the answers were variable, although all the marking points were seen and some candidates did gain maximum credit.

(iv) Most candidates realised that species died out. A significant minority did not consider any of the other information given, such as decline in biodiversity, and so did not receive further credit.

(v) The concept of heavy metal poisoning has been examined in the past. On this occasion the topic did not appear to be well understood. Very little detailed discussion of what happens with organic pollution was given, and only a very few gave any detail of why chromium pollution is so dangerous.

Question 2

(a)(i) Many candidates suggested that it was to make more profit, rather than saying that the farmers were trying to maintain their income.

(ii) Most candidates knew that increased production would further decrease prices, although not so many elaborated correctly about supply and demand

(b) There was lack of detail given in many answers. Increasing soil fertility was the most common answer, but candidates seemed not to appreciate that the farming methods were different from each other. Mixed farming was often not understood.

(c)(i) There were many very good bar charts gaining full credit. Some candidates failed to label both axes.

(ii) Almost all candidates correctly selected pepper.

(iii) Most candidates suggested a crop, but failed to give a reason for poor yield.

(d)(i) Most candidates produced a table and received high or full credit. However, there were some examples of information given in the question being copied without any input from the candidate.

(ii) Most candidates understood the issues surrounding organic farming and gave good answers.