

ENVIRONMENTAL MANAGEMENT

Paper 0680/01

Paper 1

Question 1

- (a) (i) Majority of candidates achieved the mark on this.
- (ii) About half of the candidates were able to get this right.
- (iii) No candidates were able to see that a plant will be carbon neutral, but some got one mark for indicating that it would give out less carbon dioxide, but gave no mark worthy explanation as to why.
- (b) (i) Many candidates knew about acid rain and could give two effects. There was some confusion about effects on the ozone layer.
- (ii) Many candidates were able to gain a mark for discussing non-polluting alternatives to fossil fuels, but suggestions beyond this, such as alternatives to fuel using transport or catalytic converters, scrubbers etc. were much less common.

Question 2

- (a) (i) This was accessible to most candidates.
- (ii) A good majority were able to get this correct.
- (iii) Although many had some idea about something freezing this was often not water but seemingly the rock itself. Where water froze, it was often not made clear that this caused expansion, and thus gained only one mark.
- (b) Many did not read or understand that they were being asked to talk about additional *soil* features but instead wrote about light etc. Others just repeated information already given in a different form, such as fertilisers.
- (c) There were many good suggestions; the commonest mistake was that candidates wanted to discuss soil degradation, rather than erosion. This led to much discussion of fallow, addition of fertiliser etc.

Question 3

- (a) (i)(ii) Candidates invariably got these right.
- (b) (i) The effect of the southern cold current off the coast of Peru was not well understood and it was rare to see a full answer in which upwelling of nutrients, followed by increased phytoplankton growth and subsequent increase of food supply for anchovies were discussed.
- (ii) A number knew that El Nino makes water warmer, but often could not go beyond this to discuss lack of nutrients in surface waters and poor food supply for fish.
- (c) There was generally good discussion here of quotas, mesh sizes, moratoria, closed seasons etc.

Question 4

- (a)** Most candidate correct stated B.
- (b)(i)** Those who chose to talk about A usually did better than those who chose B.

It was very common for an answer based on A to gain three, B generally yielded two but this question was, on the whole, well done.
- (b)(ii)** Many candidates knew that the DT model was used to describe the change from pyramids like A to those like B, but often gave no specific detail, such as lowering birth rates, death rates etc.
- (c)** Inevitably, many candidates wrote about pull factors and gained no credit, others were able to do quite well discussing various push factors.

Question 5

- (a)(i)** These three terms were no very well understood.
- (ii)** Most candidates got the Northern hemisphere, but many then went on to say it was nearer to the sun.
- (b)(i)** This question caused some confusion and few were able to give that the expected day length would have an effect, temperature would not. Since the stem referred to solar power and not energy, good answers about hotter temperatures were credited.
- (ii)** Most candidates knew about fossil fuels running out and causing pollution but often failed to contrast with alternatives for the full 2 marks in each case.

Question 6

- (a)(i)** About 50% of candidates got this right.
- (ii)** There were many good suggestions here and a wide range of answers was accepted.
- (b)(i)** This was well done with many of the expected points about environmental, resource and miners health effects being discussed.
- (ii)** Most were able to get at least 2 here, with a good number being able to discuss addition of soil, minerals and then planting and getting three.

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<p>Paper 2</p>

General comments

In some Centres, candidate performance was similar between **Questions 1** and **2**. In others, candidates showed a distinct preference for **Question 1**. **Question 2** included the least well answered question on this year's paper, which was **2(a)(iii)**, about why the oil is trapped. Other parts of **Question 2** that were not particularly well answered by many were **(a)(iv)** and **(b)(iii)**, **(iv)** and **(v)**, for a variety of different reasons. As usual, the stronger the candidate, the less noticeable was the difference in answer quality between **Questions 1** and **2**.

Candidates need be aware of the importance of the lettered sub-sections in questions. Sometimes the same resource is being used for more than one part of the question. Usually the separate parts are examining the same or a closely related topic. Most candidates appeared not to look ahead to the next part of the question. If more of them had done this in **1(g)**, there would have been less repetition and fewer contradictory answers between the three different parts. A significant number of candidates wrote in **(g)(i)** that 'few trees' were present in the area shown on the photograph in order to explain the high risk of soil erosion, to be followed by 'planting trees' in **(g)(ii)** for what had already been done in this area to reduce the likelihood of soil erosion. 'Tree planting' reappeared in the next part **(g)(iii)**, which asked for 'what else' the farmer might do to prevent soil erosion. In **Question 2**, few candidates appeared to recognise that **(b)(iii)** followed on naturally from both the resource used at the start of **(b)** for world oil supply and demand, and the calculations asked for in **(b)(i)** and **(ii)**.

Candidates again forfeited marks by not paying sufficient attention to command words. This need was clear from some of the answers given to parts of **Question 2**. In **2(b)(i)** and **(ii)**, 'calculate the difference' meant that the final value, complete with sign if a minus value, was marked and not any written information that might have been inserted. 'Describe how', used in **2(c)(ii)**, required a different type of answer from 'Describe' used on its own in the previous part **2(c)(i)**. 'Describe' in **(c)(i)** required nothing more than descriptive statements about tundra climate and vegetation; it was a simple test of knowledge. 'Describe how' in **(c)(ii)** required some use of the basic information, towards the main question theme of wilderness. A good number of candidates found it difficult to switch from 'Describe' to 'Explain' when changing questions from **2(f)(i)** to **(f)(ii)**. They carried on describing, which led to repetition of points without further elaboration. Earlier in **Question 1(g)(i)**, a number of candidates made no attempt to describe anything from the photograph. With this type of question, the answer was flawed. It is possible that they had looked at the photograph before writing about soil erosion, but without written description no marks could be awarded.

Comments on individual questions

Question 1

A majority of candidates contrived to get one of the three parts of **(a)** wrong. This was least likely to happen in **(a)(i)**; nevertheless, there were candidates who answered '1,000' without stating 'millions'. It was most likely to happen in **(a)(iii)**, for which Asia was the common incorrect answer. Instead of taking note of 'fastest rate of growth' in the question, candidates were over-influenced by Asia's large total of people.

In part **(b)(i)**, most candidates chose a sensible scale and drew bars of equal width. It did not matter whether the bars were arranged by countries or by dates, as long as this was clearly indicated. While small careless mistakes were occasionally made in the plotting, three mark responses were the norm. The only total failures were from candidates who attempted to draw line graphs. Accurately drawn graphs showed that India's total population is expected to climb above that of China by 2050. This was the answer required for the mark in **(b)(ii)**, but too many candidates stopped short of stating this, and noted only increases in both countries, or the greater increase in India. Part **(b)(iii)** was well answered by the many who included a good range of relevant points beyond the simple answer of use (or not) of birth control measures. References to

examples, notably that of China under low population growth, enhanced answer quality. Relevant examples are always credited, even when not specifically requested in the question (as here). A few candidates successfully used the Demographic Transition Model as their framework for answering. Occasional totally wrong answers were given, especially about reasons for economic growth in 1 and economic decline in 2. Answers arranged as two lists of reasons rarely gained more than half marks, mainly because they suffered from lack of or limited elaboration beyond the reason heading. Typical answers were of the type 'no birth control' in 1 and 'birth control' in 2.

Marks in part **(c)** were given for both general comparative description and for the use of values. It was impossible to gain more than three marks without using values as illustrations. Some candidates limited their answers to one descriptive point from the line graph and one from the bar graphs. Often they filled all the lines without mention of a value and most gained only two marks; clearly they had not taken into account the sub-mark of five for this question. It became clear that some, mainly weaker, candidates, did not understand what 'living on US\$1 per day' meant; they thought that there had been increases in dollar income in sub-Saharan Africa and decreases in Asia! For the many who used the correct technique of answering, namely description followed by use of equivalent values for sub-Saharan Africa and Asia, this was one of most straightforward questions on the paper. All the information needed for a full five mark answer was provided.

To most candidates the type of practical task in part **(d)(i)** posed no problems; there were many full three mark answers. Some began by calculating the number of degrees, but for plots of 25% and 1% this was not really necessary. For the pie graphs to be fully complete, shading in the key needed to separate out sub-Saharan Africa from the rest of the world, consistently. It was surprising to find several examples of candidates using the type of shading given for rest of the world in the key in the one per cent segment on the graph of world total of health workers. Others ignored the instruction to fill in the key. Part **(d)(ii)** was less well answered than might have been expected. One unforeseen problem was the misinterpretation of health workers for 'healthy workers', leading to frequent comments along the lines that only one per cent of workers in sub-Saharan Africa were healthy enough to work. This made answering the question set much more difficult. The best answers came from those candidates who recognised the link between hunger and lower resistance to disease. Without adequate health services, young and old were at greatest risk.

Although weak candidates stayed too close to the information provided in the boxes in part **(e)**, the majority wrote enough to convince the reader that they understood that the diagram showed a repetitive, self-perpetuating cycle, with poverty as its root cause. Greater candidate understanding was often demonstrated by references to the need for aid, investment or help from outside in order to break the cycle. This question was intended to lead candidates into part **(f)** about types of aid. Since the question referred to 'this poverty cycle', 'B Development Aid' was regarded as the best choice in **(f)(i)** and 'A Food Aid' was considered to be the least useful type of aid in **(f)(ii)**. In both cases, 'C Farm Aid' was regarded as the middle choice, capable of being used either positively or negatively for the question theme. Good choices made for easier justifications and more likely three and four mark answers; there were plenty of them. However, it was difficult for candidates to justify the reverse choices of A in **(i)** and B in **(ii)**, to produce answers worth more than one mark. A wide variety of reasons were used by candidates, which were rewarded provided that they remained faithful to the poverty cycle shown in part **(e)**.

Likewise part **(g)** elicited a full and varied range of answers from candidates. In **(g)(i)** an essential pre-requisite for the award of marks was some reference to natural features which could be seen on the photograph, such as steep slopes, bare surfaces and limited natural vegetation cover. Only then were candidates rewarded for further elaboration about the contribution of these to a higher risk of soil erosion in this area. No description from the photograph meant no marks. Fortunately only a minority of answers were general answers on soil erosion, of this type. Some descriptions were better than others; for example, 'mountainous area' suggested that the candidate had looked at the photograph, but it could have been obtained solely from the caption, and it was not as precise and useful a description as 'steep slopes'. There were many two mark answers based upon only one observed natural feature. In **(g)(ii)** candidates who began from observation of the prominent staircase of terraces fared best. Although some struggled to find the term terraces; alternative ways of describing terrace were also accepted. Less successful were answers from candidates who suggested that tree planting had taken place, especially if they had included comments about the lack of vegetation cover in the previous part. Answers to **(g)(iii)** were inconsistent in quality and depth. Instead of referring to two of the strategies named in the syllabus (tree planting, contour ploughing, dry land farming and windbreaks), quite a number of candidates concentrated more on use of fertilisers and irrigation water. These agricultural techniques are more significant for increasing farm output than preventing soil erosion. The more successful answers tended to include references to tree planting, accompanied by one from contour ploughing or dry land farming.

Question 1 covered familiar topics (especially population growth and soil erosion) and included questions which required the use of practical skills. Together these probably explain why a majority of candidates (and in certain Centres a very dominant majority) gained a higher mark than in **Question 2**.

Question 2

While the most popular answer, 'sedimentary', was also the correct answer in part **(a)(i)**, plenty of candidates were attracted to the other two rock types. In addition, some circled two of them, while others missed the question out. Sedimentary rock was a common wrong answer to **(a)(ii)**. Other answers frequently seen, which were not credited, were 'fossil fuels' and 'fossil' by itself. Only a minority of candidates seemed aware that oil was made from the decomposition of plants and small creatures. Part **(a)(iii)** was answered even less well. Some left it unanswered; others showed themselves to be impossibly muddled between the characteristics of permeable and impermeable rocks. A significant proportion of candidates believed that it was the layer of sandstone rock which was trapping the oil and preventing it from moving. Under the circumstances, it was a real pleasure to read the answers of candidates who had clear understanding of the roles of sandstone in providing the storage spaces and clay in keeping the oil inside the sandstone layer. Few mentioned the importance of rock structure for forming the trap; indeed more references to anticline were noticed in the next part of the question, suggesting that candidates knew the name but could not recognise it as one common type of oil trap. Answers to part **(iv)** were either totally incorrect or effective; few fell between these two extremes. Many candidates referred either to opencast or deep shaft mining, or to both, as if oil were a solid instead of a liquid. Fortunately there were others, who understood that drilling with pipes from the surface was the usual method. Oil is forced out to the surface by pressure or pumping. Success in part **(iv)** meant that candidates were more likely to choose acceptable answers such as fire or explosion in **(v)**, rather than unacceptable answers such as breathing problems and tunnel collapses with mining methods.

In response to the command word 'calculate' in **(b)(i)** and **(ii)**, it was the final answers that were marked (12.4 and 19.2 respectively). A few candidates wrote about the differences without doing a calculation; a small number of others made one careless error. For the third mark, the candidate needed to make clear that one of the values was negative and the other positive. Quite a large number failed to claim this third mark. This question was intended to give candidates a start with their answers to part **(iii)**. Unfortunately a lot of candidates never looked at the pictograph again. If they had, they would have been able to offer answers that were more precise, by referring to the size of oil surpluses in the Middle East, matched by equally large oil deficits in the developed world. Depth and quality in part **(iv)** depended heavily on reference to an example; without at least a passing reference to an example, the mark limit was two out of four. The Exxon Valdez disaster in Alaska was the most popular (and generally successful) choice. However, it was good to see candidates making use of local examples from Argentina and the Gulf. In part **(v)** candidates frequently referred to factors which affected the likelihood or otherwise of an effective clean-up, but without bending the content towards the main theme of the question. Thus location (land or sea, coastal or offshore), preparedness (developed or developing countries) and size of spill were regularly mentioned, but not always used in a way that took the answer above half marks.

In **(c)(i)** references to climate were more consistently accurate than were those to vegetation. Reference to coldness was the starting point for most candidates. Little precipitation, or most falling as snow, tended to claim a second mark more often than use of temperature values. Perhaps as much as half the candidature believed that tundra lands were covered by coniferous forests, in what was obviously confusion with the taiga to the south. 'No trees' is one of the defining characteristics of the tundra biome. Candidates were better at selecting and stating relevant pieces of information unaltered than actually 'describing how' they show that the area is still a wilderness when answering **(c)(ii)**. Many answers could have been converted from two to four marks if the chosen information had been better used.

Candidates had few problems in answering **(d)(i)**. Plenty of help was available to them in the source material provided. The economic needed to be separated out from the environmental, which not all managed to do. However, some significant losses of marks were caused by candidates allowing their pro-environmental opinions to take over too early. The wording of this part of question **(d)** did not give the option to talk about not-allowing more oil extraction in Alaska. Claiming all the marks in part **(d)(ii)** was more of a challenge. In expressing an opinion, some candidates 'sat on the fence', which usually meant that they had little to add to what they had already written in the previous part. The command word in part was 'explain'; too many continued to describe more than explain and restricted themselves to no more than two marks. This question gave more able candidates the opportunity for demonstrating understanding of the broader issues associated with developing a highly prized world commodity in a beautiful and fragile environment. It was not the candidate's own opinion which mattered, but the quality of the explanatory comment.

Only those candidates with a firm knowledge of oil traps and oil extraction were able to maintain quality and consistency of performance throughout **Question 2**. For many, the number of marks increased in each part of the question, being lowest in part **(a)** and highest in part **(d)**.

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Coursework

General comments

Enthusiasm continues to be shown by candidates for their environment through a good range of environmental issues being chosen. These topics tended to be well researched and presented. However, there is a general tendency to lose impetus when it comes to putting together a reasoned plan of action for future sustainability and it would benefit candidates if this aspect of the coursework was focused on by their teachers.

Most Centres provided excellent comments to support their marking and those that did not are urged to do so in the interest of their candidates.

Some choices of topics to investigate did not allow the candidate access to domain C due to a lack of a sustainability aspect to the issue chosen.

Domain A

Some excellent teaching of the processes in the specification is reflected by the candidates' firm grasp of it in domain A. In addition candidates were generally good at relating their local problems to the broader aspects of the issue.

Domain B

Research was carried out thoroughly by most candidates, although there were some this year with no primary data. Interviews were well analysed and there was good use of secondary data such as newspaper articles.

Domain C

As in previous years this continues to be the weakest area and discriminates between the more able and the weaker candidates. The Centre marking this year often did not recognise the weakness of candidates here. There continues to be a problem with topics that do not lend themselves to a sustainability debate and there needs to be careful monitoring in the initial stages when candidates are choosing their topics for investigation.

Candidates often fail to put together a reasoned argument on sustainability and simply give a list of possible solutions with little discussion of pros and cons. Criterion 9 continues to prove to be the most problematical where a strategy is needed.

There is also a greater need for candidates to analyse how the different

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Paper 4

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one African country, Cameroon. Many candidates understood and made good use of the source material and their written responses were sufficiently clearly expressed that the Examiners could be confident that marks awarded were deserved. The mathematical and graphical questions did pose some difficulties for a minority of candidates.

Candidates had no problems completing the paper in the time available, however there was some evidence that candidates did not always make best use of the information given at the beginning of each question.

Overall the pattern of this paper is very similar to past papers and Centres should work through past papers to help candidates see how to make the best use of the information given for each question.

Comments on specific questions

Question 1

- (a) There were nearly always correct answers to every section. Occasionally units were given on plotted graphs.
- (b) Candidates were not always clear as to **how** they would measure the volume of milk collected. Most of the tables presented would have been usable but again some units were not stated.
- (c) The majority of candidates appreciated the break point of 1200 metres and shaded from the bottom of the graph up to that height. In **part (ii)** the information given was used to carry out a calculation; unfortunately some candidates added 4.2 to 30 degrees rather than subtracting it.
- (d) This was a more demanding calculation and though some candidates lost their way others gave correct answers given with units. In **part (ii)** most candidates suggested that the cattle were in danger from falling into the well or contaminating the water supply with faeces. In **part (iii)** a wide range of sensible answers were given credit. However the possibility of the bullock getting tired was not given credit.

Question 2

- (a) Candidates needed to look carefully at the diagram and the information about an experiment. There were a large number of vague answers to part **(i)**, essentially the idea is that the conditions for growth were the same, e.g. rainfall, soil type etc. If candidates suggested that it would be easier to see the difference because the plots were next to each other they gained a mark. Parts **(ii)** and **(iii)** the sampling methods are essential knowledge for this paper but unfortunately they were not well described or explained in most cases. Part **(iv)** the role of earthworms was often appreciated but the explanations would have gained more credit had the process of digestion been stated to allow the minerals to be released. The Examiners were pleased to see the roles of aeration and drainage were understood by some candidates. In part **(v)** the candidates had to do more than just describe the findings as they were asked to draw conclusions from the data given. If they made two sensible suggestions as to why there were less casts in plot B they gained two marks. In part **(vi)** a wide range of suggestions were given and most gained some credit. However there were many inappropriate references to changing seasons and the word accurate was greatly overused. Repetition of a trial may make the findings more reliable but not more accurate.

- (b) Parts (i) and (ii), the number that identified the samples that either spread black pod disease or helped control the disease should have been stated. Some candidates gave the total number for each question.
- (c) Plan A was often chosen and one or two sound reasons given for this choice.
- (d) Both parts of this question did not elicit clear answers, in part (i) candidates could often express the idea that the treatment did not seem to have reduced the fungus infestation but there were not many ideas as to how to extend the investigation that fitted the context of the question.

Question 3

This question changed the focus to the problems associated with fishing.

- (a) Candidates were given a range of statements about a fishing village and were asked to explain why the facts stated were worrying. Many candidates took some of the statements and explained why the fishing would not be sustainable in the longer term. Surprisingly there were not many candidates who suggested the fish did not have time to reproduce or that if so many immature fish were being caught they could not be reproducing. The published mark scheme suggests a large number of creditworthy suggestions. Unfortunately some candidates arranged the statements into a paragraph but did not add any of their own ideas and so they could not gain full credit for this. In part (ii), a specific nutrient was required here, fish as a major source of protein was known by many candidates. Part (iii), sensible suggestions to do with the breeding or carrying of diseases or named diseases gained credit. Human sewage can cause the spread of disease but vague references to pollution or pollution from the fishing boats was not given full credit.
- (b) This section was well answered by most candidates, control of fishing effort seems to be very well known and the suggestions were invariably sensible and creditworthy.
- (c) The concept of sustainable food supplies was understood by most candidates and many sound answers gained two marks.
- (d) There were a significant number of candidates suggesting that the captive breeding programme would create new species which is not the correct idea. Only a minority of candidates went beyond saving the fish from extinction to suggest they could be reintroduced at a later time or that keeping them in captivity would at least hold their genetic makeup for the future (either for human use or to release back to the wild).