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FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

UNIVERSITY *of* CAMBRIDGE
International Examinations

ENVIRONMENTAL MANAGEMENT

Paper 0680/01

Paper 1

General comments

It was felt that the paper was of about the same level of difficulty as in previous years, but there was some evidence that the performance of candidates is improving. **Question 6** proved very difficult in the sense that the terms were not well understood, maybe because they have not been examined much in the past. It should be noted that questions may be set on any part of the syllabus, regardless of frequency in earlier years.

Comments on specific questions

Question 1

This question proved to be a fairly easy starter to the paper, especially sections **(a)(i)** and **(a)(ii)**. In **(a)(iii)** the most common wrong answer given was industrialised countries, although many identified Middle East or SE Asia correctly.

In part **(b)(i)**, many were able to gain one mark, but did not always relate the problem to its effect on quality of life.

Part **(c)** was quite well answered, the most common problem being that answers were limited to the benefits to be gained from the improved trade and saying little about how these benefits were to be achieved. There were some candidates who did not understand the question.

Question 2

(a)(i) The graph was usually completed accurately, although not always neatly.

(ii) This question was not well done as many interpreted the graph as if it showed those *with* access to clean water. This unfortunately often linked to a lost mark in the second part as well.

(b) Most were able to identify avoidance of disease as a benefit of clean water, and frequently went on to get the second mark for a relevant example. The commonest reason for loss of marks was for reference to water bred rather than water borne diseases.

(c) Most were able to suggest a strategy that was creditable, but were restricted to only one mark because instead of developing their answer they merely listed two other strategies where the question only asked for one. This aspect of exam technique could well be stressed in the future, too little notice is taken of limitations like this in questions, candidates preferring to write all they know from some trigger word.

Question 3

(a)(i) This was poorly answered, with naming of areas rather than a description. Again, the importance of looking at the information provided should be stressed. Here, for example, the positions of the equator and the tropics were clearly placed on the map, but a small minority of candidates referred to the positions of soil erosion with respect to these fixed points.

(ii) This question was well answered, rain and associated erosion followed by dry soil and the effect of wind being deduced by most. The most common problem was to talk about dry weather, without relating that to dry soil or land.

(b) Most candidates were able to name a damaging practice (e.g. tree removal) but it was less common for the second mark, for how this would operate, to be awarded.

(c) Marks here were awarded for reference to positive strategies including contour ploughing, afforestation, rotational grazing etc., marks were often lost for quoting lists of do nots.

Question 4

(a) Most answers here were correct, although some had no idea at all. Transpiration figured a lot for both processes.

(b)(i) The majority of candidates were able to deduce that levels would rise.

(ii) Many candidates were able to gain 3 marks of the 4. The most common loss of a mark was due to them giving no explanation for the rise in temperature, they correctly said, would occur. Flooding as a consequence of sea level rise was only acceptable if it was specified as coastal.

(c) Many candidates were able to suggest all kinds of correct consequences for wildlife of deforestation, but appeared to have failed to notice that they needed to discuss how this might be reduced for further marks, thus few gained full marks.

Question 5

(a)(i) Candidates tended to get either all of this right or none, although it was generally quite well known.

(ii) Those that were comfortable with **(a)(i)** tended to be correct here, but many thought the mantle to be the source of fossil fuels.

(iii) This question was well answered, with few not getting the mark. Wood was the most common incorrect answer given.

(b)(i) There were many correct answers, although vague reference to air pollution was not accepted.

(ii) Many identified the source as geothermal, and then went on to make two further simple points about the process to gain full marks.

Question 6

(a) This question produced very high scores, based directly as it was on the passage.

(b)(i) There was poor knowledge, in some areas, of exactly what ecotourism is. This area needs to be addressed.

(ii) This section was not well answered and often was just a regurgitation of the passage with negative comments.

(c) There was very poor knowledge of the work of these organisations, which are specified by their acronyms on the syllabus. There are other areas which need addressing.

Paper 0680/02

Paper 2

General comments

Among the majority of candidates, performance in **Question 1** tended to be better than in **Question 2**, sometimes significantly. It was not easy to determine the main reason for this, although answers given to many parts of **Question 2** were frequently poorly directed towards question focus and main command words, notably 'state', 'describe' and 'explain'. Too many candidates attempted to explain instead of 'state' in **2 (a)(ii)** and to state instead of 'explain' in **2 (a)(iii)**; likewise, many either explained instead of described in **2 (d)(i)** and **(ii)** or else gave entire answers based on negatives (i.e. what could not be seen in Sketch **A**). Better descriptions of the housing in Sketch **A** were often seen in answers to Sketch **B** in **2 (e)(i)**, where they could not be credited. As a result, there were occasions when understanding of topic content was shown without adding to the number of marks awarded.

As usual, unanswered parts of questions were few and far between; when present, they were most likely to be associated with weak candidates who were ready to give up by the time they reached **2 (f)**. Knowledge was needed to answer the first two parts of **(f)**, which these candidates probably did not possess. It was possible that a few had genuinely run out of time, especially some candidates who appeared to have a lower command of English.

The following questions were the ones in which full marks were rarely claimed.

Question 1

(a)(iii) Many candidates failed to identify the solid particle chosen by them; 'in the troposphere' or its equivalents were not considered to be good enough for identifying 'greater concentration'.

(g)(i) This was not the type of question where candidates could 'work out' the answer directly from the source materials. It was intended to be a more testing question that demanded higher levels of understanding.

Question 2

(a)(i)(ii) One mark answers were the norm because only one location (typically Africa) was named in the first part and only one statement (usually 'above and below 2.5' or 'higher in the South and lower in the North') was given in the second part.

(b)(i)(iii) Little direct use was made of the values that would have helped to convert the usual one mark answers based on increases in population into two mark answers.

(c)(ii) Too often the question instruction to 'use evidence from the table' was ignored.

(d)(iv) 'Resulting from a location around the edge of a big city' was ignored by many candidates; any one of the urban problems associated with poor housing, such as crime, lack of sanitation or pollution, was substituted by candidates.

Candidates should be advised to take more notice of the stated number of marks for a question than of the number of lines left for answering. As always, there were great differences between candidates for the number of words it took before they began to answer, instead of repeat, the question. Most candidates continued to regard a full answer as an answer with all lines full; they appeared to stop writing as soon as the lines finished. This certainly contributed to one statement answers given to two mark questions, or to partial answers worth two marks to questions with four and five marks available. Future candidates can be advised that it is acceptable to continue answers beyond the lines into empty spaces and onto blank pages, provided that the number of the question being attempted is made clear to the Examiner. Many candidates must have had time in the examination to have developed more fully some of their answers.

It proved difficult for the majority of candidates to maintain quality of performance across the many different questions. Although some truly excellent scripts were seen, with the spaces left for answering full of relevant detail and comment throughout, the majority of scripts included one or more sections which were low scoring. Some candidates made a slow start on pages 2 and 3, especially if they were unfamiliar with divided bar graphs in **1(a)(i)**, failed to identify one the solids in **(a)(iii)** and were unable to explain the roles of carbon dioxide and water vapour in **(a)(iv)**; many recovered once the question focus switched to ozone and air pollutants in the following parts. For others the decline began on page 14 from **2(d)(i)** onwards, mostly due to a failure to match answers to the needs of the question rather than through a lack of knowledge of housing problems in cities of the developing world. Only the strong candidates, with a good knowledge and understanding of environmental management, were able to maintain consistency of performance through the variety of content and skills questions in an examination paper composed of structured questions.

Comments on specific questions

Question 1

The majority of candidates exhibited familiarity with a divided bar graph in **(a)(i)**, although some were too generous with the area devoted to 'others' which needed to cover less than one square. At the other extreme, a few did not know where to begin and tried to insert separate bar graphs within the frame. Only about half the candidates correctly chose 'water vapour' in **(a)(ii)**; some also included carbon dioxide, which invalidated their answers. In **(a)(iii)** repeated failures to name the solid chosen reduced the number of successful answers, even before the hurdle of naming places with a likely greater concentration was overcome. Greatest understanding in **(a)(iv)** was shown by candidates who explained carbon dioxide by reference to photosynthesis and water vapour in terms of the water cycle. Answers, in which carbon dioxide was referred to only in terms of greenhouse effect and global warming, were too narrow for more than one mark.

Answers to **(b)(i)** were disappointing. Only a minority of candidates worked out the difference in thickness of the atmosphere (9000 metres) between the equator and poles. Easily the most common answer was '8000', simply the thickness of the atmosphere at the poles. Those who answered 'above the stratosphere' in **(b)(ii)** exposed a lack of knowledge and understanding about the position of the ozone layer. Part **(b)(iii)** was the best answered part; the role of ozone for protecting living organisms against the worst effects of the sun's ultra-violet rays was really well known. Good answers continued into **(c)(i)** and **(c)(ii)**, except from those candidates who associated depletion of the ozone layer as the main cause of global warming. The highest quality answers came from candidates who knew that the ozone hole was discovered in Antarctica, where no permanent settlement exists, which triggered references to the fact that the causes of the pollution responsible for depleting the ozone layer had to come from elsewhere in the world.

The graph in part **(d)** was not completed with the customary consistent accuracy associated with a vertical bar graph. Perhaps candidates were discomforted by the size of the values to be plotted, because many made one or two errors in completion. On numerous occasions the bar for **D** was plotted higher than the one for **C**; it seemed that these candidates were trying to plot **C** at 12 000 or **D** at 119 000. A significant minority left this question unanswered, which was difficult to understand. In past years, candidates have found the practical skills questions to be among the easiest questions on the paper. The mark in **(e)(i)** was an easy mark, but it was not claimed by all. Sometimes nitrogen and/or sulphur alone were written down. Other candidates substituted carbon monoxide and/or carbon dioxide; these two gases remained a source of confusion for some throughout the other parts of **(e)** and into part **(f)**. Although a few tried to answer **(e)(ii)** without linking emissions to health problems, and occasionally without even mentioning a health problem, most gave answers that were sufficiently all-embracing to be worth both marks. Carbon dioxide was the best and most popular choice in **(e)(iii)**. From some candidates, explanation was dominated by references to greenhouse effect. This was considered to be an inferior response compared with absorption by plants or respiration from humans, the two answers which dominated from other candidates.

In part **(f)**, most candidates recognised the significance of differences in scale. The choice of carbon monoxide in **(i)** produced the most consistently successful answers, which could be justified either by amount of traffic or second largest amount emitted. Explanations for greenhouse effect and global warming from carbon dioxide and for acid rain from sulphur dioxide and oxides of nitrogen for effects that were more worldwide were equally successful in **(f)(iii)**. It was impossible for candidates to recover in part **(iii)** from the choices of carbon dioxide in **(i)** and carbon monoxide in **(ii)**, which showed that they had totally missed the point of the question.

Candidate understanding was essential for delivering successful answers to part **(g)(i)**. It was pleasing to discover that some able candidates were able to identify the inversion of temperature, as well as understanding its significance for trapping the pollutants in the atmosphere below. Only a few, however, were able to appreciate the effects of the strong sunlight in promoting the chemical reaction to create low level ozone. Full marks related to pollutants trapped between the two mountain ranges, shelter from the main wind direction and sinking air preventing the upward escape of surface pollutants were more readily gained by candidates in the top half of the ability range. The questions which formed parts **(g)(ii)** and **(iii)** were more straightforward. A wide variety of positive suggestions were accepted in **(g)(ii)** that covered transport, industry, and energy consumption in general. Negative suggestions, such as reducing the use of cars, industries and fossil fuels, were not accepted, because they were not strategies. Provided candidates tried to answer positively by naming a strategy, these two marks were obtained by candidates of all ability levels. To part **(g)(iii)**, two mark answers were the most common, typically for reference to the large concentration of cars and industries in cities and to their importance, which made it difficult to reduce their numbers. Many candidates re-stated the same two points until they had filled the lines. Only candidates who covered a broader range of points, such as non-stop growth of cities, people's love of the car, weak controls and problems of enforcement, gained access to marks at higher levels. These candidates were in the minority.

Responses were generally quite strong in **Question 1**, even if a candidate's final mark was lowered by inferior answers to one or more parts of the question. The topic areas examined were in general well known and understood; this allowed the majority of candidates to maintain their momentum up to and including the final part of the question. However, candidate confusion between greenhouse effect, global warming and the hole in the ozone layer remained as great as ever.

Question 2

'In the South' was not considered to be a good answer to part **(a)(i)**, as a summary for the locations of countries with very high fertility rates above 5.5. 'Africa' was a much better answer and for many it was the first and only mark. Other locations were needed for the second mark, such as 'Middle East' or 'South-west Asia' or more detailed references to the distribution within Africa. Incorrect references to 'Southern Europe' were included in a surprisingly large number of answers. Answers without the names of places were inevitably too vague for a mark. In part **(a)(ii)** one mark was easily achieved for appreciating the general difference in fertility rates between the two sides of the line, but only a minority worked for the second mark by quoting supporting values and locations. Instead, a significant number began to offer explanation for the differences. A few totally misinterpreted question requirements in part **(a)(iii)**, either by describing and stating variations in fertility from the world map in more detail or by switching to fertility in agriculture. The latter approach went totally against the definitions of fertility spelled out in the question and was divorced from the question theme both before and after. Candidates who merely reversed what they said for developing and developed tended to offer the weaker one and two mark answers; however, there were plenty who varied the content and used supporting examples to gain the higher marks. China was the most widely used example of a country with a population policy, while use of local examples enhanced answer quality as well. Overall, this question examined a well known topic.

Few candidates claimed all the five marks available in part **(b)**. There were too many comparisons between developed and developing in **(b)(i)** and not enough use of values to support description from the graph. In the better answers, candidates noted the differences in rate of growth with a marked slow down from about 1990 onwards. Some candidates used the word 'change' throughout their answers without ever establishing an increase. In **(b)(ii)**, many failed to examine the bars for 1975 with sufficient attention to detail and came up with the answer 'about the same', which did not fit the theme of 'major change' in the question. One mark answers to **(b)(iii)** were dominant. Although a good number quoted the expected total in 2025, they failed to quote another comparative value to make an effective elaboration for large increase.

Among those who recognised that difference in income was the economic reason needed in part **(c)(i)** were some who failed to state that income was higher in urban areas. Few attempted to state the size of the difference (E£1 100), which had been hoped for originally. Social reasons as common as the economic reason. Part **(c)(ii)** was one of the least well answered questions on the whole paper. A significant percentage of candidates failed to base their answers on 'evidence from the table', as demanded by the question. Few, if any, used the values to state the size of the differences between urban and rural areas; instead values (if referred to) were merely repeated. The best answers came from those who tried to explain differences by reference to water-based diseases and their effects on health, particularly that of infants.

Failure to follow the command word 'Describe', rather than lack of understanding, was the main cause of mark losses in **(d)(i)** and **(ii)**. Many candidates did not describe what could be seen; instead they concentrated on writing about what was not present – cement or brick walls, proper roofs, and services such as water and electricity. A list of building materials used seemed to be given just as frequently under **(e)(i)**, where it could not be credited. References to self-help, the variety of building materials, named building materials such as cloth, canvas, tin sheets and wood and housing appearance (the look of an unfinished shanty home) were the descriptive mark earners missed by many due to deficiencies in answering technique. Answers to **(d)(iii)** were typically more relevant until the question focus was lost again in **(iv)** due to insufficient attention to 'around the edge of a big city'. In appropriate answers, environmental effects of sprawl, distance from services and work, and land pollution from the use of the area for disposing of waste from the entire city, were the three problems referred to most.

To gain both marks in part **(e)(i)** candidates needed to mention both building materials and services and most did; two mark answers were the norm. How well **(e)(ii)** was answered varied markedly from one candidate to another. The two reasons used most often were increased income after finding formal work and improvements made by city authorities or governments. These formed the basis for some effective answers. On the other hand, candidates who began with statements such as 'To improve the services', 'To prevent the spread of disease' or 'To improve the appearance of the city for tourists' misinterpreted the question's needs.

Answers to part **(f)** gained fewer marks than was expected. Little real knowledge of either irrigation or new seeds showed through in the majority of answers – yet questions have been set on these topic areas in previous years that were better answered. Answers of 'rural' and 'urban' were the commonest for the Area in **(f)(i)**. For this mark to be awarded, a place name was needed, with the name of a country representing the minimum level of acceptance. This proved to be too high a demand for many. Specific information about the area named in **(i)** was generously rewarded in **(f)(ii)**, but it was rarely seen, being largely confined to the scripts from the more able candidates. References to why irrigation was needed and techniques of irrigation were in remarkably short supply, as also were references to high yielding or genetically modified seeds if the alternative choice was used. Little knowledge was shown in the majority of answers. It was disappointing that candidates did not make more use of examples from their own countries. Part **(f)(iii)** was a different type of question. The answer 'Yes' was surprisingly popular; in a few cases it was really well supported by precise references to ways of helping farmers improve output and quality of life. The answer 'No' was justified best when both push and pull factors were included. This question elicited the full range of responses, although with a majority of two mark answers for both 'Yes' and 'No'. Understanding of the basics was apparent in these answers, but real supporting explanatory detail was absent.

Answers given to **Question 2** lacked consistency. In the typical script, the number of parts containing inferior answers was greater than in **Question 1**. Among weaker candidates, short answers increased from **(e)(ii)** onwards. Only the best candidates appeared able to maintain their high levels of performance throughout and to complete the examination in style with a packed answer to **(f)(iii)**.

Paper 0680/03

Coursework

General comments

A good range of topics was submitted which were very well produced; continuing to show the benefit that candidates get from carrying out coursework. There was, however, the usual inclusion, from some candidates, of topics which struggled to address the natural economy criteria. The problem arises when there is not a limited resource which can be shown to be an issue of sustainable development. These research topics result in a report which is more akin to a well researched essay than an environmental management investigation.

Assessment Objective A

This continues to be the strongest area for most candidates. This reflects the high standard of teaching, of the content of the syllabus. It also illustrates the benefits of carrying out coursework since candidates cannot perform well here unless they have a good grasp of the process content involved in their topics.

Assessment Objective B

In producing write-ups of their investigation candidates learn how to use data analysis and techniques of presentation. They show off these talents to good effect and this continued to be the case this year. However, Criteria 6 requires more thorough analysis to gain top marks.

Assessment Objective C

As usual this proved to be the weakest area for candidates. Candidates continue to show that they can appreciate the problems involved in environmental management but fail to put all the ideas together to come up with a reasoned strategy for Criteria 9. More time spent teaching candidates to assess pros and cons of alternative options would help them to improve their marks here.

Paper 0680/04

Alternative to Coursework

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of an African country, Rwanda. The majority of candidates made use of the source material and were able to display their knowledge of environmental management. The mathematical and graphical questions were attempted by nearly all the candidates and there was no evidence of candidates being unable to complete the paper in the time available.

Comments on specific questions

Question 1

Some climate data for two farms was presented and candidates were asked to identify the months with rainfall greater than 100 mm and the driest month for each farm. Most candidates inspected the table of data carefully and selected completely or partially correct answers. In part **(c)** the graph was nearly always orientated in the correct manner and there were fewer mistakes in setting out the scales than in past years. A majority of candidates produced clear line graphs with a key.

Part **(d)** required a percentage calculation, unfortunately many candidates could not select the correct figures from the table to complete the calculation, correct working gained one mark even if no answer was presented. Three plans were presented and candidates were asked to draw a table to record the data for plan C. Nearly all candidates drew a table; the best examples had space for the data and clearly headed rows and columns. Some candidates attempted to produce a table from all the plans and there were even a few attempts to produce a graph.

Candidates seemed to find part **(d)(iii)** rather difficult and those that did correctly suggest plan **(a)** often failed to give a convincing reason for their choice. Similarly in part **(e)**, data was presented and it was anticipated that candidates would recommend that at least half a hectare of sorghum was needed to be grown and that weeding was essential, however, most candidates gave a range of general suggestions that were unrelated to the information given in the table, such as use an alternative source of energy. These suggestions rarely gained any credit.

Part **(f)** described an experiment in words and diagrams and presented data gathered by candidates from the experiment. The Examiners were a little disappointed to find that some candidates could not study the table and select the correct answer for waterlogged conditions. However, in part **(ii)** there was an appreciation of the need either for accuracy or the need to calculate an average value. Many candidates gave clear suggestions and reasons for growing selected crops on farm **A** and **B**. In part **(iv)** only a minority of candidates expressed their answers clearly and suggested sensible factors that must be kept the same if the experiment is to be repeated.

Question 2

A diagram of a crop rotation was presented with Field 5 being much smaller than the others. Candidates were asked which field the farmer should make bigger and the Examiners were surprised to see a wide range of answers, especially as the scale of the diagram was clearly given. Only a very small number of candidates suggested that a larger Field 5 would make crop rotation easier. In part **(b)**, candidates completed the diagram in such a way as to show understanding of the concept of rotation even if each row was not always correct. In part **(c)**, completing the table proved difficult for many candidates though they often successfully explained the differences between the two groups. Most candidates found it difficult to suggest ways of collecting data accurately.

In part **(d)** most candidates appreciated that the soil profiles were in two groups but in some cases they thought B, C and F were in the open rather than under the trees. Part **(ii)** only required answers relating leaf fall to deeper topsoil and erosion to shallow topsoil, unfortunately many candidates only described the properties of top or sub-soil.

Question 3

This question asked candidates to make judgements about different crop plantings. Most candidates realised they were being asked to suggest why each idea might make things worse for the farmer and a wide range of valid answers were given. The planting of GM maize elicited many inappropriate suggestions about the health risks to humans of eating GM food rather than focusing on the cost or the possible special requirements of a GM crop.

Part **(b)** was often carefully answered and 4 or 5 marks awarded. Any reference to the use of a particular method, needed to be qualified so that the practice would have been sustainable.

Question 4

This questions some of the effects of mining wastes and why people become miners. The counting of particles in part **(a)** was often correctly completed though many candidates attempted this without making any marks on the diagram. Striking through each particle seemed to be the most reliable method of finding the correct answer. Some candidates seemed to be confused by the terms nearest and furthest but sometimes they could go on to give a correct reason. In part **(iii)**, the risks to humans and plants were well known by most candidates. The Examiners were particularly pleased to see many references to reduced photosynthesis and reduced growth rather than the plant dies.

In part **(b)(i)**, nearly all candidates understood the need for tax revenue or export leading to foreign exchange.

In part **(b)(ii)**, candidates were asked to prepare a questionnaire to find out why people became miners.

The layout with more than two possible answers to each question was often excellent and gained credit. However, some of the questions were aimed at finding out about conditions in the mine rather than finding out about peoples' previous employment and how much money they now earn compared to their past employment.

Future candidates taking this examination should be encouraged to read each section of the question paper and study diagrams carefully before writing their answers.