ENVIRONMENTAL MANAGEMENT

Paper 5014/01

Paper 1

General comments

For the majority there was little difference in average performance levels between the total mark for **Questions 1-4** in ***Section A***, and the individual mark for answers to each of **Question 5** and **Question 6** in ***Section B***; any variation in answer quality tended to be candidate specific. In this session there was no evidence that any of the candidates were short of time for completing the paper, despite the tendency to write some very full answers to certain parts of the short questions in ***Section A***. In a few cases going well beyond needs considering the number of marks available. Similarly there did not appear to be any marked differences in ease or difficulty between the four ten mark questions in ***Section A***.

In ***Section B***, **Question 5** focused upon pollution and over-fishing, topics which were generally well understood by candidates. The most striking weakness that emerged was for knowledge and understanding of how algal blooms affect marine life in part **(d)(iii)**. The themes covered by individual parts of **Question 6** were more varied. The average mark was slightly lower than for this question largely because part **(g)** emerged as the single most difficult question on the paper.

As in previous examinations, practical graph based questions were consistently the best scoring. The main disappointment was the failure to quote accurate values from graphs to support description such as in **5(e)**. Future candidates should be reminded that the use of examples can greatly enhance the worth of an answer, even if these are not specifically requested in the question. The best opportunity in this paper was in question **5(c)(ii)**; what a difference the use of an example made, particularly if it was taken from the candidate's home country.

As in previous years, some candidates extended their answers into the empty spaces left below the lines. The greater the number of marks for the question, the more likely it was that the extra content was going to obtain marks unclaimed by the part written within the lines. However, if extensions like this for questions in ***Section A*** had resulted in short or incomplete answers to later questions in ***Section B***, it would not have represented good examination technique. Many able candidates did take notice of the number of marks for each part of the question and tailored the range and variety of points, as well depth of answering, to the relative worth of the question. The majority could have saved time and words by beginning to write the real answer more quickly without repeating all or part of the question – never needed for examination answers written in a booklet with individual spaces below the questions to be answered.

Comments on specific questions

Section A

Question 1

The type of plate boundary was universally known in **(a)(i)** as also was the ocean plate of the Pacific in **(a)(ii)**. Likewise direction of plate movement was also known in **(a)(iii)**, but the mark was could not be awarded when the arrow was added on the map so that it was partly or entirely within the Australian plate. The focus in **(b)** was confined to the economy; those candidates who included a significant number of social references in their answers tended to fill all the lines and stop writing before they had claimed enough of the available marks for economic. For whichever option was chosen in part **(c)**, cost formed the basis for the majority of answers; only those candidates who went further by making suggestions relating to the unknown strength and position of future earthquakes lay claim to the second and third marks.

Question 2

Part **(a)** posed no problems. Some answers to part **(b)** suffered from concentration on effects, which that this was the least well answered part of this question. In this type of answer any mention of chan pattern of ocean currents and distribution of the warm and cold water related to changes in pressure a wind direction seemed to have been included by chance. El Nino was known well enough, but it was clea that many candidates had failed to make best use of their knowledge. Part **(c)** generated many more successful answers with frequent relevant references to coral protection and related advantages for the local people and economy.

Question 3

In the best answers to part **(a)(i)** candidates looked for disadvantages from three boxes that were truly different – as emphasised by the use of bold for 'different' in the question. Some candidates used pollution of water and pollution of soil as two different disadvantages – in a way they are different, but they are not as different as those that could have been chosen from other boxes. In **(a)(ii)** one of the expected answers such as fertiliser, machinery and land consolidation was usually used by candidates in box A; However, in **(a)(iii)** candidates found it less easy to find the best entry for box B related to the idea of more than one crop per year. The quality of answers given to parts **(b)** and **(c)** were related to the number and range of points which candidates attempted to give. Those who relied heavily upon cost in both parts gave the narrowest answers that did not claim more than half marks.

Question 4

Part **(a)** posed few problems, although in part **(iii)** candidates were required to make clear that the competition between plants was for water supply. Both groups named in part **(b)** were chosen with equal frequency by candidates. Many of the answers were starter answers worth up to two marks – some basic explanation of way of life and survival was given, but without sufficient content to claim more marks. Almost all candidates gave the expected answer of desalination in **(c)(i)**, which enabled them to make acceptable suggestions in part **(ii)** typically related to unlimited potential and expense.

Section B

Question 5

Few candidates gained all of the first five marks in **(a)(i)**. Although most candidates recognised that the sea currents were the key to answering **(a)(ii**), some failed to give the fuller description of the pattern or to notice the lack of exits from the North Sea that were needed for claiming the second mark. In part **(iv)**, either close to the land sources of pollution or shallow water were acceptable answers; it seemed somewhat haphazard whether or not a candidate referred to one of these.

The bar graph in **(b)(i)** was normally completed with care and accuracy; if a careless mistake was made it was often for either the Scheldt or Weser. The intention was for part **(b)(ii)** to be answered from knowledge; in the event, most candidates appeared to refer back to the key for the North Sea map. In order to gain both marks, a candidate needed to name two from sewage, animal waste (manure) and (synthetic) fertilisers instead of merely repeating 'fertilisers and manure' from the key to the map, accompanied by one of the others such as chemical industries or oil and gas fields.

The full range of answer quality was witnessed in part **(c)**. Less able candidates were stronger on giving examples of the sources of pollutants in **(c)(i)**; the worth of an answer reflected the range of points made. Often they made little further progress in **(c)(ii)** because they did no more than repeat, or minimally extend, their answers to the first part. More able candidates managed to incorporate a range of reasons in the second part by using factors such as amount of industrial activity, level of economic development, effectiveness of pollution controls and river size and length. Included in some of the best answers were references to examples, often drawn from their home country.

Most candidates understood the role of plankton in the marine food chain shown in **(d)(i)**. Answers to **(d)(ii)** suffered from too much basic description of how this food chain works with no more than a passing reference to the main question focus of 'food chains under threat'. Those who noticed that pollution was directly affecting all levels of the food chain and that marine resources were also being depleted by fishing were the ones who soon claimed all three marks. Two mark answers in which candidates referred either to pollution or to human use, but not to both, were common. In part **(d)(iii)** there was enormous variation in the quality of answers given. Some candidates showed a full understanding of how the decomposition of algal blooms led

to a reduction in oxygen levels in the water; others included the term eutrophication, but it soon that they did not fully appreciate how it operated.

In part **(e)** there was an easy mark for noting overall decline from 1970 and 2000. After this, candidates greatly reduced their chances of gaining any more marks by deserting the command w 'Describe' and attempting to give reasons for this decrease. The second mark was awarded for some description of intermediate trends. The third mark was reserved for the use of values to support trends. Although many more candidates quoted values in this examination than in previous ones, within some answers values were never given, even if all the lines had been filled – showing a real weakness in technique for describing from graphs.

The plentiful information given in the North Sea Time Line in part **(f)** was most useful to candidates when answering part **(ii)**. They needed to do no more than merely repeat verbatim the words above the sketches to gain all the marks. Those candidates who included summary references to new technology and to the significance of catching smaller and younger fish were the ones who laid their claim all three marks quickest. There were plenty of them, although perhaps not as many as might have been expected. Part **(f)(i)** was different – this question demanded understanding and discriminated well between ability levels. Able candidates referred to numbers having fallen so low that they had reached a point where they were unlikely to be able to recover to the levels needed for commercial fishing to continue.

Strategies for managing the world's marine fishing grounds were generally well known. The ones stated most were quotas (in various guises especially Total Allowable Catch), maximum net sizes, areas closed or restricted for fishing and limits on certain types of fish. Parts **(ii)** and **(iii)** elicited answers which varied greatly in quality. Those candidates who began their answers to **(ii)** by referring to the 'Do Nothing' option and commenting on its obvious lack of sustainability made more rapid progress than those who said yes and answered only in terms of all options being sustainable. When in part **(iii)** candidates made use of examples of options, and in particular controlling pollution at the same time as needing to use one or more of the fishing related options, effective answers were produced.

Question 6

Precise knowledge of the names of all three labelled parts of the rain gauge shown in **(a)(i)** was often lacking. Filter was a common incorrect alternative for funnel for A, and there were many cylinders and tubes for B and C instead of containers. For reasons of stability (expressed in many different ways) was the most commonly made point among answers to **(a)(ii)**, followed by stopping splash back and then reducing evaporation. Few candidates failed to gain two or more marks. Candidates, who tried to base their answers to **(a)(iii)** upon the poor choice of site for the rain gauge under trees or buildings, failed to answer the question in the manner intended. However, candidates who focused upon problems associated with heavy rainfall and strong winds, or referred to the problems associated with measuring other types of precipitation such as snow and hail, addressed the question in a more direct way.

Some of the answers to part **(b)(i)** suffered from a weakness in graph interpretation; 309, 428 and 301 were quoted as totals for rainfall in June, July and August as a result of counting squares instead of using the correct scale. Adding these together did not give the correct total of 1065 mm. In **(b)(ii)** candidates needed to do more than just make the general point that total rainfall was higher in August and September than in May and June. Some candidates were satisfied with just this statement, which barely began to give the real answer. Of much greater importance was the way in which the high rainfall totals in these two months followed from the wettest month (July) and other months of good rainfall, whereas May and June were at the start of the wet season. Once a candidate adopted this line of answering the two marks were soon claimed.

In **(c)(i)** it was essential for candidates to select at least two pieces of evidence (as suggested by the availability of two marks) that truly suggested the exceptional nature of the flood event in 2004. Values about the height of flood levels, the amount of the country flooded, the numbers killed and affected, and the size of the rainfall total on September 13th in Dhaka illustrated this better than references to the type of damage caused. A surprisingly high percentage of candidates went no further than stating 'in the countryside' when answering **(c)(ii)**; this answer did not take into account that part of the question which referred to avoidance of normal monsoon floods.

For **(d)(i)**, the selection of references from the newspaper report to silt fertilising the land and to fish providing protein for the diet gained the first two marks for stating two advantages. In order to convert this into a four mark answer, the candidate needed to make some attempt to add some explanation for their importance. Although less directly referred to in the newspaper report, there was a third advantage that some candidates used, namely water supply, which was equally acceptable. A few referred to all three advantages,

sometimes without any attempt to explain the importance of any of them, which left answers s… y two marks. Parts **(d)(ii)** and **(iii)** were among the least well answered parts of this question. Altho… term' and 'long-term' are relative time scales which are incapable of precise definition, they do have … accepted use in connection with the aftermath of natural disasters in relation to the different types of a… are needed. In the report the clearest reference to long-term problems was in the final sentence at the … of the fourth paragraph. However, only some found this; it was quite common for both parts of **(ii)** to be filled with short-term problems. Answers to **(iii)** not only suffered from the inability to separate short-term from long-term, but also from a failure to mention any strategies. This combination resulted in a high percentage of unsuccessful answers. Too many candidates referred only to problems and effects for a second time in answers to part **(iii)** without offering any suggestions for dealing with them.

All correct pie graphs were the norm in **(e)(i)**. A few calculated the angles, an unnecessary procedure given that the values added up to 100%. For full marks candidates were expected to copy as closely as possible the shading used for forested areas in order to allow comparison with the non-forested areas. The correct answer to **(e)(ii)** was runoff, comfortably the most popular answer, despite the attractions of groundwater for those who looked only at the pie graph for forested areas. There was a close relationship between number of acceptable points and candidate quality in the answers to **(e)(iii)**. More able candidates were much more likely to explain higher rates of interception, transpiration and water use in forested locations. In answers from less strong candidates references to just one process were more typical and it became clear that specialist terms like interception were being used as frequently for obstruction of surface flow or absorption of water by tree roots as for stopping and delaying rainwater from reaching the surface. Some even more inferior answers were more about soil erosion than movement of water.

In part **(f)**, some candidates digressed into the uses and users of weather forecasts before they had given a complete explanation for the increased accuracy of weather forecasts. Improved technology both in data collection and use was the main theme used, which typically led to two mark answers. Only those candidates who emphasised wider and more global data collection from upper atmosphere and over the oceans to supplement that from the many land stations generated answers worth three or four marks. Answers to part **(g)** often skirted the questions set and relied upon just one idea. In line with established practice on this paper for questions in which candidates are invited to give and explain their own views, there were no separate marks for the view chosen. All the marks were distributed for the strength and quality of explanation, irrespective of view. Candidates who answered 'No' to one or both of the questions seemed to find it easier to offer explanation worth three or more marks. They put forward arguments based on the exceptional scale of the floods in 2004, the difficulty of communicating with people in remote rural areas and the shortage of funds and expertise to enable preparations to be made in advance. Others discovered that they could do no more than repeat the same point, often related to shortage of expertise and money, to both parts.

ENVIRONMENTAL MANAGEMENT

Paper 5014/02

Paper 2

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one African country, Lesotho. The 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) (i) There were a wide range of appropriate responses and the examiners were pleased to see that most candidates suggested three reasons why livestock needed to be looked after.

(ii) The majority of candidates gave the correct answer. If the sum of 700 divided by 140 was shown but without a final answer one mark was awarded.

(b) (i) Candidates often seem to lack knowledge of sensible sample sizes for questionnaires or experimental sampling. Any suggestion between 5 – 10% was acceptable, there were some examples of answers larger than 700.

(ii) The questions presented by the candidates to complete the questionnaire were usually easy to follow and suitable spaces for three or more responses were drawn in. The questions were some times aimed rather more towards the motivation of the boys in taking part in the learning programme rather than trying to find out how they had benefited having completed the programme.

(iii) Candidates found it difficult to explain how to use the results of the questionnaire to find out if the living standards had really improved. The Examiners were expecting to see suggestions as to how to use the questionnaire in an unbiased way with some ideas about how to analyse the information. There were a few good answers, the Examiners gave credit for responses that showed some appreciation about how to use questionnaires.

(Iv) However in this section there were a good range of appropriate answers to explain why the education of boys was a priority.

Question 2

This question explored aspects of climate and the hydrosphere.

(a) Candidates needed to look carefully at the table of climate data and select appropriate answers. Many candidates did this and presented appropriate or nearly appropriate answers. However a significant minority seemed to have stated answers that were relevant to their local environment.

(b) (i) There were a wide range of good answers with useful knowledge of the role of [illegible] carbohydrate in the diet being displayed.

(ii) Candidates from many centres were familiar with the method of measuring flow rates and completed the captions with clear statements. Other candidates gained some credit from a muddled set of captions; about 10% of candidates did not attempt the question, this often happens if dotted lines are not present and indicates that candidates are not reading the paper carefully.

(iii) The calculations were often completed correctly and if an error was made then subsequent answers correctly calculated gained credit.

(iv) Many candidates either estimated or calculated 6 days correctly.

(c) (i) Many candidates appreciated where silt would be trapped on the diagram and showed shading between and above both sets of stones. There were examples of total shading and some with no shading. The dotted line did seem to prompt nearly all candidates to present an answer and even if they only gave a suitable description on the dotted line they gained credit.

(ii) A wide range of sensible answers were given.

(iii) Root binding was well known as was the process of interception.

(iv) Replanting trees with further detail of controls or only cutting branches gained the marks.

(d) This was an open question and candidates were able to gain all four marks for reasonable suggestions with a described or implied advantage. The candidates with limited command of English found it hard to express their ideas, the Examiners considered their answers carefully and gave credit were possible.

(e) Most candidates appreciated that turbine P would receive less wind due to obstructions and they could think of two uses of electricity.

(f) (i) Nearly all candidates attempted a graph and only a small proportion plotted the 17.00 hour data as well (which was ignored by examiners). Many chose appropriate scales and plotted correctly. A common error was not to label both axes fully, metres per second (m/s) or equivalent was frequently missing.

(ii) The patterns were complicated but the examiners were pleased to see that good candidates could describe the decreasing and increasing wind speeds accurately.

(iii) Many selected B and gave one convincing reason, a second reason from the data was only suggested by good candidates.

Question 3

This question changed the focus to methods for carrying out a field trial.

(a) Candidates who suggested details that should be kept the same for the planting, the harvest and the recording could easily gain 6 marks. The examiners were disappointed with the number of vague or inaccurate answers presented. Planting one bean of each type or measuring the length of each bean at harvest were not sensible suggestions. Very few candidates weighed the crop or counted the number of sacks (of the same size). There was a mark for writing down their results in a table (or notebook or on a graph).

This type of question will be asked in every paper to examine the data collection aspects of the syllabus. Had candidates carried out coursework this type of work would be at the centre of their report.

(b) A wide range of reasons why the farmers decided not to plant the GM bean were given. The cost of the beans, the fact that some could not be saved for next year and their fear of low harvest (for a variety of reasons) were the best answers. Some credit was given to suggestions that they might need more water or fertilisers.