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ENVIRONMENTAL MANAGEMENT

> **Paper 0680/01**
> **Paper 1**

General comments

This was the first paper set on the new syllabus, though there is a very close link between this paper and the old 0670 Natural Economy Paper 1. The format of the paper was also new, with candidates being required to answer six questions at 10 marks each, rather than four at 15 marks each. The new layout of the paper caused few problems for the candidates, though perhaps it is worth mentioning that now the paper addresses six themes rather than four, candidates will need a fuller knowledge of all aspects of the syllabus. While this posed no problems for most Centres, in some cases, the questions did reveal gaps in the knowledge of some candidates.

In general, however, candidates responded well to the paper, which clearly addressed topics with which most were familiar. Very few candidates produced really weak scripts, and at the top end of the mark range, there were some quite outstanding papers.

Comments on specific question

Question 1

This question was about earthquakes, a topic with which all Centres were familiar.

(a) Part **(i)** required candidates to define an earthquake. Naturally, all candidates knew what an earthquake was, though some failed to pick up an easy mark by not mentioning the sudden nature of the movement. The question went on to require candidates to plot two points on a scattergraph, which most were able to do. Parts **(iii)** and **(iv)** were largely answered correctly.

(b) This part required candidates to explain why the strongest earthquakes do not cause the greatest loss of life. Many candidates missed the simple point that earthquakes can occur in regions which are very sparsely populated.

(c) This part of the question required candidates to consider strategies that governments could adopt in preparation for an earthquake. Most answered this question well, though a significant number of candidates saw evacuation of the area as a viable proposition.

Question 2

(a) In this question, candidates were required to complete a bar graph, which most were able to do accurately. Parts **(ii)** and **(iii)** proved a little more testing, however, with relatively few candidates managing to identify 1960-70 **(ii)** and around 52 million tonnes **(iii)** as the correct answers.

(b) In this part of the question, most candidates were able to suggest reasons for the decline of coal mining in a country, and most were able to name two renewable forms of energy.

(c) While most candidates were able to suggest strategies for the conservation of non-renewable energy sources, many answers were vague and lacked detailed knowledge. Relatively few candidates were able to write about domestic ways of conserving energy.

Question 3

This question concerned some aspects of the water cycle.

(a)(b) These posed few problems for the candidates and many had no trouble in gaining the first four marks available.

(c) Candidates were less familiar with the term interception, many confusing it with absorption. Many candidates wrote about other effects of deforestation, rather than linking it to interception, as required by the question.

(d) In this part of the question, candidates were required to explain how building towns and cities may increase the risk of flooding. Many saw this only in terms of deforestation, and relatively few were able to write about the creation of impermeable surfaces which tends to increase surface run off.

Question 4

This question concerned hot deserts and carbon dioxide levels in the atmosphere.

(a) This was generally well answered, with most candidates being able to describe where areas of hot deserts are located, and to explain why desert areas are difficult to farm.

(b) This part concerned the potential for generating solar energy in hot deserts. Most candidates were able to write about the long hours of sunshine common in desert areas, though relatively few referred to the fact that hot deserts are often sparsely populated, and that large areas would be available for the solar panels.

(c) This was familiar to most candidates and the majority were able to identify a human activity which could lead to increased carbon dioxide levels in the atmosphere. Again, most were able to suggest ways in which carbon dioxide levels might be reduced.

Question 5

This question concerned tropical rainforests and their destruction.

(a) This proved quite testing for many candidates, with relatively few gaining the 4 marks on offer.

(b)(c) This proved relatively easy for most candidates who were able to give two reasons why rainforest destruction is taking place, and two environmental changes which could result from this.

(d) In this part, too many candidates answered in a negative way, referring to what should not be done rather than what should. Afforestation was mentioned by many, but few were able to say much more, and few candidates gained both marks for this part.

Question 6

This question concerned population issues. For many Centres, this question was the most productive of marks, though in a few Centres candidates' familiarity with the issues raised was a little sparse.

(a) Most were able to complete the table correctly.

(b) Again, most candidates had little trouble with this part of the question. Infant mortality proved more difficult to define than life expectancy; but the great majority were able to explain why developing countries tend to have a lower life expectancy and a higher birth rate than developed countries.

(c) This part was well answered.

General comments

On this paper there was a significant difference in candidate performance between **Questions 1** and **2**. Although not noticeable for high performing candidates, a clear majority of candidates achieved better on **Question 1**. The fact that **Question 2** was taken from the atmosphere part of the syllabus might have been a factor. There were also many instances, mainly among less academically strong candidates, of high levels of confusion between greenhouse effect, lower level atmospheric pollution and hole in the ozone layer. Hole in the ozone layer should not have been mentioned as it formed no part of the question as set, but the presence of CFCs in the table in the first part of the question appeared to be the trigger for repeated references in subsequent parts of **Question 2**. It was a surprise that part **(c)** was the least well answered part of the question by some margin. Only in a minority of responses was the Kyoto Protocol mentioned; some based their answers upon the Montreal Protocol instead. The majority answered at a national rather than international scale, which severely limited the overall effectiveness of their responses. In contrast, **Question 1** was well answered throughout. Many candidates possessed the understanding and supporting case study knowledge that allowed competent responses to the different parts on population, fishing and deforestation.

Answers to all questions were given by most candidates. Pressure of time did not appear to be an issue. Some candidates continued their answers into the spaces below the lines left for answering, while a few continued answers on the blank pages at the back of the booklet. The number of lines left for an answer can be no more than an indication of length of answer expected, and assumes that the candidate has normal size handwriting and does not fill lines by repeating the question before beginning the answer, as some do. As usual, the rule seemed to be that candidates filled all the lines and then stopped answering. This appeared to happen irrespective of number of points made and marks available. In general candidate's use of additional empty spaces was a good sign, although it was essential that candidates clearly indicated question numbers when the blank pages from page 18 onwards were used.

The examination technique of some candidates was at fault because they did not read ahead to later related parts of question before starting their answers. This led to a crop of repetitive answers to two or more parts of the same question. After giving a second answer that was the same or similar, some candidates needed to go back to cross out the original answer and write a replacement. The questions which suffered most from this were **1 (b)(iii)**, **1 (b)(v)**, **1 (f)(ii)** and **2 (d)**. What distinguished all these questions from their preceding questions was the fact that candidates were asked to explain differences between places (rural and urban areas, developed and developing countries, some parts of the world and some countries more than others). Candidates were no longer being asked for general reasons for reducing populations, falling birth rates, forest losses and effects of global warming. Answers needed to be focused upon why they were different and this type of answer was not always forthcoming. The place named first in this type of question needed to be given at least equal and preferably more treatment than the one named second. Therefore in **1 (b)(iii)** not only was an answer overwhelmingly based upon rural areas inferior, but also it often overlapped with and repeated the answer already given to **1 (b)(ii)**. In order to deliver a fully successful answer, the dominant comment had to be about how and why circumstances in cities were different.

Questions which begin with the command word 'Describe' in association with source materials (whether graphs, tables, diagrams or photographs) tend to be easier than average ones for scoring good marks. In this examination too many candidates forfeited easy marks either by not describing at all, or by switching to explanation after one descriptive point was made. This was noticed most by Examiners in answers to **2 (b)(ii)**. Virtually all candidates, irrespective of levels of ability, began with the statement that emissions of carbon dioxide were higher in developed than in developing countries, but at least one third of candidates then lost the plot by mentioning large amounts of industry, high car ownership and the like in developed countries, which accounted for the high emissions. Given that this was a three mark question, a further two descriptive points were needed for full marks, which were difficult to obtain without relevant values from the graph being quoted.

The name change from Natural Economy to Environmental Management was the big change with the introduction of the new syllabus. Content was amended only slightly. A greater emphasis was put on case studies; **Questions 1 (b)(iv)** and **1 (g)(i)** reflected this change in emphasis. The first of these about strategies for reducing population growth was particularly well answered, especially if China or the candidate's home country were the countries selected. The second about areas in which deforestation is occurring typically contained less precise information about the named area. Some of the problems in **1 (g)(i)** seemed to originate from named regions in the graph in part **(f)** on the opposite page, particularly Africa and South America, being chosen, which led to over-generalised answers about deforestation. Many were little different from those given in **(f)(ii)**, except that they filled up more lines.

Comments on specific questions

Question 1

Part **(a)** was the easy opening question. Completing the three bars on the graph posed few problems in **(a)(i)**; however, completing the key was another matter. It was amazing how many candidates had first used the same line shading inside their own bars, only to look in the key and start rubbing all of their shading out! There was, of course, no requirement to leave the bar empty of shading; the reason for putting an empty bar in the key was to allow any type of shading or colouring in to be used for estimated population, as long as it was different from that used for the total recorded population. Few candidates experienced any difficulty drawing in the summary line through the tops of the bars in **(a)(ii)**. Several different answers were allowed in **(a)(iii)**. 1974-1999 and 1987-1999 were clear cut answers for question wording, although 1999-2010, a popular answer, was also accepted because it covered the lowest number of years for any of the one billion population increases. Few failed to understand the answer needed in **(a)(iv)**, but some candidates left too much to the Examiner as a result of weak or inadequate expression.

It was a surprise to find such a large minority of candidates failing to use the values for birth and death rates in part **(b)(i)**. No mark was available for merely re-stating birth and death rates as some candidates did without any mention of significance for population growth. Candidates who understood natural increase and completed the calculation (either as 28 per 1000 or 2.8%) took the fast track to two marks. Although few missed the two marks in **(b)(ii)**, in **(b)(iii)** more of the answers failed due to poor focus on cities, as was referred to in the general comments above. Some good case study knowledge was presented in answers to **(b)(iv)**, supported by worthwhile comments about how successful. From some information about China was given after naming Japan as the country. Many answers to part **(b)(v)** were no more than statements of reasons why birth rates had fallen, which led to repetition of points already made in previous answers. The best answers came from candidates who attempted to use factors of greater significance to this question's comparative theme, such as higher levels of economic development, more effective population strategies and greater status of women. A minority gave irrelevant answers based upon falling death rates.

Good understanding of the meaning of sustainability shone through the answers given to part **(c)**, despite the problems encountered in applying them to the given information. Some candidates followed the road to nowhere by making separate references to crops, animals and biomass, which was not what the question was about. The disappointing feature of the majority of answers to part **(d)** was the absence of real information about soils as a follow up to the general statement about their importance for cultivation, which virtually all provided. Many one mark answers were the result. Answers to all parts of **(e)** were characterised by good understanding of the fishing industry and its problems. Some candidates did not need the help that the diagrams gave for answering **(e)(i)**. Quotas and closed seasons were the most widely suggested strategies in **(e)(ii)**. Much was known about the problems of effective implementation of the strategies in **(e)(iii)**. Only a few weak candidates struggled throughout the question by attempting to carry the theme of modern technology right through the question from the first part to the end.

One mark answers to part **(f)(i)** were too frequent considering the low level of question difficulty. After having stated that the greatest loss was in Africa, usually with the support of the minus 8% from the graph, there was no precise follow up use of graph information about other regions, in order to emphasise the scale of the difference between Africa and the rest. Many of the answers given to part **(f)(ii)** were more appropriate to the question 'Give the reasons why forests are being lost'; the superiority of answers, even with just a hint of a comparative element within them, stood out. The best answers to **(g)(i)** came from those candidates who named a country, or a region within a country such as the Amazon Basin and Congo Basin. In order to obtain more than half marks the answer needed to ring true for the named area. This was not easy to achieve if continents other than Africa and South America were named. However, from candidates with real case study knowledge of Brazil, Indonesia or their home country many full and convincing answers were seen. Answers to part **(g)(ii)** demonstrated widespread understanding of the role of plants in recycling carbon dioxide.

Responses in **Question 1** were generally strong; from able candidates, they were also of consistent quality. The crop of inadequate answers to a few of the questions seemed to have as much to do with poor examination technique as with understanding of the subject matter covered by the question.

Question 2

Part **(a)** was well answered. In **(a)(i)** most candidates took the hint either from the source example already completed or from the four marks attached to the question to name more than one source for each of the three greenhouse gases. Sources of methane were least well known. Taking values from the graph was an easy task for almost all in **(a)(ii)**, not withstanding the occasional example of carelessness or misunderstanding. Some made no effort to use what the table showed in **(a)(iii)**; instead they answered in terms of more widespread use of the sources producing CFCs without any hope of success. For those who used the table in the manner intended, explanatory answers, based on the use of both percentage contributions and number of years, were a necessity; a significant percentage used only the latter. Despite an overuse of negatives, such as 'stop cutting down trees' or 'reduce burning of fossil fuels', many tried to identify at least one strategy that was positive in part **(a)(iv)**. Good knowledge was shown of renewable source of energy, alternatives to CFCs and the usefulness of catalytic converters.

In **(b)(i)**, the scale at which the graph needed to be drawn in order to accommodate the wide range of values meant that it was not easy for candidates to read off accurately amounts for emissions in Europe and Sub-Saharan Africa. Therefore any value between 9 and 11 times was accepted, and even slightly outside this range if the answer was based on a visible attempt to take correct readings from the graph. What was disappointing was the number of candidates who guessed or estimated rather than measured the value for sub-Saharan Africa at 1000 kilograms and, worse still, the even greater number who believed that the difference in kilograms between them was the same as the number of times greater. Too many candidates laid no claim to two of the three marks in part **(b)(ii)** by not using values from the graph to describe what it showed about differences in emissions between developed and developing countries.

During the life of the previous syllabus questions were regularly asked about the need for international action to deal with types of pollution, over-fishing and other major world problems. Therefore it was difficult to understand why the word international, which was included in bold in the question, was ignored by so many candidates in their answers to **(c)(i)**. Mentions of Kyoto and later summits and conferences were so rare that when one came along it felt like a breath of clean fresh air. Only in genuinely international answers were both parts of **(c)** well targeted. Some of the comments made in **(c)(ii)** about the difficulties of moving away from a fossil fuel orientated world were considered to be worthy of credit, despite the fact that they stood alone from the first part of the question.

From many less able candidates answers to part **(d)** were barely explanatory; the emphasis was on repetition of information from the diagram with a minimum of added comment. One step up in quality were answers which included some outline reasons, often in the context of more worry for developing than for developed countries. For more than half marks, country references needed to be more explicit. Low lying countries such as Bangladesh and the Netherlands were named countries used most frequently in more successful answers.

Limited description from the map, often with no more than passing and somewhat sweeping references to India and China, left many answers to part **(e)(i)** worth only one of the two marks. Some of those who studied the map with more care and answered with a higher degree of precision about location gave answers worthy of more than the two marks available. The question asked in **(e)(ii)** exposed wide variations in candidate familiarity with the skill of labelling diagrams; for some the task itself was the obstacle even before accurate placement became the issue. Label 1 was best placed in the lower atmosphere at or below where Asian brown cloud was named. The best possible position for label 2 was where lines for incoming radiation were shown to be deflected upwards towards the upper part of the cloud, although some tolerance was allowed. In **(e)(iii)** effects on incoming radiation could be obtained from the newspaper report; for the second mark, understanding of how the greenhouse effect operates was essential. A considerable number of irrelevant references to hole in the ozone layer appeared in answers. According to those candidates, the process was quite simple; the hole allowed more sunlight in and global warming resulted. It was very easy to distinguish between candidates who understood and those who did not. 'Yes' answers in **(e)(iv)** were easier to explain by reference to the role of winds in the transfer of air pollutants and to high levels of population and economic growth in major Asian countries. However, a few able candidates made good attempts based on answers of 'no' by emphasising the somewhat special conditions that applied over a wider area in Asia than elsewhere.

In the final part **(f)**, the complete range of answer quality was seen. At the lower end, within the first band of assessment, were answers which over-relied on restating information quoted in the stem of the question, with very few real additions. In the middle band meaningful description in part **(i)** was followed by explanation in part **(ii)**, even though overall coverage remained too narrow for the highest band. There tended to be an over-reliance upon one idea. Within the top band, some candidates answered with enthusiasm and supported their views with real content. It was revealing to see how much relevant information could be packed into the spaces left for answering.

Many of the answers given to **Question 2** lacked consistency across the different parts of the question. Having picking up marks in part **(a)**, many gave inadequate responses to one or more of the parts with high mark allocations, namely parts **(c)**, **(d)** and **(f)**. This kept their total mark below what was achieved by them in the first question. If gaps in answering existed, they were more likely within this question.

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Paper 0680/04
Paper 4
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General comments

This paper explored the impact of human activities on the environment of New Caledonia, an island in the Pacific Ocean. The candidates generally made good use of the sources of information provided and they displayed good knowledge of the subject. The practical technique tested was well understood by most candidates. They wrote clearly and attempted all the questions.

Comments on specific questions

Question 1

(a)   This number handling exercise was done successfully by many candidates, unfortunately sometimes the percentage was not quoted to one place i.e. 47.3 or 47.4%.

(b)   The concept of supply and demand was well understood. However some candidates did not suggest enough changes to the lives of the people or the economy of New Caledonia to gain maximum marks. This is an example of where candidates need to look at how many marks are available for a question and provide an answer of sufficient depth or number of points.

(c)   There were many good thoughtful questions given and usually the layout allowed for plenty of alternative responses. Some candidates wanted to explore more effects on the environment which was inappropriate as it was titled as a health questionnaire.

(d)   Many candidates appreciated that they needed to sample from more than one location; some used real locations from the map and others described this in general terms. The idea of taking a representative sample was less well understood though it was rare to see an answer suggesting the whole population should be interviewed. Those candidates that knew about the subject easily gained two marks.

(e)   The X was often nearer the smelter than the Y but the Examiners were disappointed to see that the prevailing wind direction was ignored and some letters were placed in the sea.

(f)   The graph was plotted correctly by most candidates and the relationship between rainfall and dust was clearly stated as well. Part **(iii)** was not as well answered because candidates often confined themselves to suggesting the smelter should work in the rainy season but failed to discuss weather forecasting or a suitable number of days working and non working.

Question 2

(a)   The data handling was more testing here and many candidates either failed to take note of the units used for the data or carried out an incorrect mathematical procedure.

(b)   The number of tomato plants seemed to be an obvious difference between the two gardens but it was rarely given as an answer. All the other alternatives on the mark scheme were seen.

(c)   This proved to be a hard question. Many candidates were convinced that sea water was being used and it was rare to find a correct answer. However in part **(ii)** the process of evaporation or absorption of water leaving the salt behind was well understood by many candidates. Part **(iii)** asked candidates to describe a method of measuring flow using all the equipment shown, the Examiners were pleased to see a large number of clear and complete answers, sometimes with excellent diagrams.

(d)   In part **(i)** most candidates chose two or three correct statements suggesting irrigation may not be sustainable but many found it demanding to take one statement and then make two further points of explanation. The same difficulty applied to part **(ii)**.

Question 3

(a)   The effects of oil pollution were either not very well known or candidates did not describe events very clearly. In part **(ii)** a small number of candidates misread five miles offshore as five miles of shore. Maximum marks were only occasionally given.

(b)   The first part of the question required some thought about the data presented and there were some good answers describing the effects along the food chain. Weaker candidates described death and destruction only in general terms. Part **(ii)** did not have as many references to breeding as expected. Some species are going to take much longer than others to recover, for example because they take longer to reach breeding age. Part **(iii)** often had a statement that all the species had recovered and only a small number of candidates suggested some possible figures that related to the data given.

(c)   The first six months following the oil spill was often well described, but some candidates spoilt good answers by referring to drinking water implying that the sea is used for this. References to farming crept in as well and these were not given credit. Suggesting longer term effects proved to be a little harder, however the best candidates scored maximum marks.

<u>**Overall**</u>

The candidates completed all the questions and usually attempted to answer the question being asked. Nearly all the answers were easy to read and clearly expressed. This was evidence that the candidates had been well prepared by Centres.