ENVIRONMENTAL MANAGEMENT

| Paper 0680/01 |
| Paper 1 |

None of the six questions appeared easy for candidates. Some sub-sections were more straightforward than others and some candidates found a couple of sub-sections particularly difficult. There were very few misinterpretations of questions. Some scripts were difficult to read due to poor handwriting. All candidates appeared to have completed the paper in the allowed time, although there were inevitably some blank sections on some scripts.

Question 1

(a) (i) Most candidates answered this correctly.

  (ii) The majority calculated the correct average flow of 300.

  (iii) Most candidates identified the Tia as providing the most efficient water supply, but they were less successful in clearly explaining why.

(b) (i) This question was not so well answered as had been hoped. A large number of candidates suggested reasons relating to a dam being built in an economically less-developed country rather than Australia, writing about water-borne diseases, etc.

  (ii) Few candidates gained full marks for this question. Very few mentioned the large amount of energy required for desalinisation, although many were rewarded for suggesting that a country must have a significant coastline.

Question 2

(a) (i) Most candidates correctly identified 16 units as the amount needed to give the best barley yield.

  (ii) Very few candidates related reduced yield to water in the soil depriving the barley of air or oxygen, and thus nutrients.

(b) (i) Only a relatively small number of candidates were able to clearly explain how irrigation increases salination.

  (ii) This question was not done well, with most candidates suggesting that native plants absorbed the salt in soil, leading to increased salination when they were removed, rather than relating their answers to reduced water absorption.

  (iii) Explanations of trickle drip irrigation were quite good and a pleasing number of candidates were able to go on and discuss how the more efficient delivery of water to crops would lead to reduced amounts to pick up salt and subsequently evaporate.

Question 3

(a) (i) Very few candidates could explain the term renewable.

  (ii) There were many answers correctly identifying two dangerous chemicals emitted from car exhausts.

  (iii) Some choices of chemicals had the potential to score better marks than others, carbon monoxide being an unfortunate choice for a few. The effects of carbon dioxide on the environment were well-known, as were the potential of oxides of sulphur and nitrogen to produce acid rain, and the subsequent effects of this on people and the environment.

(b) This question was generally well answered, with better candidates being able to suggest three measures that could be taken. Even weaker candidates were able to score here.

Question 4

(a) (i) Many candidates explained the term *ecosystem* correctly, although a good number were not clear about interactions between its components. Few could explain vegetational succession, which suggests that this is a specification area which needs addressing in more detail.

(ii) Most candidates scored full marks for matching the pictures with the ecological processes.

(b) Although there were some excellent answers to this question, some candidates described the process of clearing natural ecosystems instead of giving reasons to explain why they might be cleared.

Question 5

(a) (i) Many candidates were unable to state accurately the yields shown on the graph for 1955 and 2000.

(ii) There were some very good answers explaining how increased yields were brought about in Mexico by the Green Revolution. The use of agrochemicals such as pesticides and herbicides were the most frequently quoted measures. A significant number of candidates talked about GM in this question, obviously not having understood the time-scale involved.

(iii) Some candidates also found difficulty in reading the answer from the graph.

(b) A pleasing number of candidates described with confidence problems resulting from the Green Revolution. The idea of a widening of the rich farmer/poor farmer gap was widely mentioned, with the effects of over-use of agrichemicals being well understood by many.

Question 6

(a) Most candidates were able to state what coal is, and make reference to many millions of years or the origin of coal in vegetation. Many gained full marks.

(b) (i) Most candidates calculated that 2,700 million tons of coal will be produced.

(ii) Very few managed to work out accurately how much more will be produced in the peak year than in 2000.

(iii) Some struggled to come up with more than increased demand as the reason for the rise in coal production in the USA. Suggestions about new finds were common, as if just finding coal would necessarily lead to its exploitation.

(c) This prompted some written answers illustrated by drawings of the reclamation following a period of open cast mining, although few candidates managed to gain full marks. Overburden, topsoil and vegetation were referred to and drawn, but there was little mention of methods of soil improvement.

ENVIRONMENTAL MANAGEMENT

General comments

The standard of answers given by most candidates to **Questions 1** and **2** were very similar. This was despite **Question 2** being mainly based on the Atmosphere unit. In previous papers, answers to questions based on this unit have frequently been inferior. The progress made was encouraging. For some, part **(a)** in **Question 1** proved to be more difficult than parts **(b)-(f)**. Overall, however, the vast majority of candidates exhibited considerable familiarity with the topic of fishing. The final part, **(g)(ii)**, was the least well answered part of **Question 1**. Many candidates failed to focus on the question set, instead spending time describing how the strategies named in **(g)(i)** would work, and seemed to assume that they were all easy to implement. The most troublesome part of **Question 2** appeared to be **(c)(i)**. Only a minority of candidates showed much knowledge and understanding of extensive pastoral farming. Likewise 'plant new varieties of crops' often failed to trigger references either to high-yielding varieties or GM crops. Consistently more successful were the answers for large dams and trickle drip irrigation.

The desire to fill all the answer lines provided for each question was noticed again, and it remained just as strong as in previous years. However, there were huge variations in the speed with which candidates began to answer the actual question set. Often the main mark-earning parts of answers were concentrated in the lower half, often within the last two lines. Too many candidates continued to begin by repeating instead of answering the question. The use of a booklet with spaces below each question for answering renders any repetition unnecessary. The majority of candidates obviously felt that they had fully answered a question once all the answer lines had been filled. Wise candidates, displaying good examination technique, looked at the number of marks available, and tried to include a wider range of points and more detailed elaboration or exemplification in answers worth four or five marks. While the short questions within both **Questions 1** and **2** were answered as well as ever in this year's examination, the two longer final parts appeared to be less well answered than usual. The final part of **Question 2** suffered particularly badly from this. Many eight- and nine-line answers essentially referred to nothing more than stating that developed countries were richer and better educated, and that developing countries were poorer and people were less well-educated. Education in this question did not seem to be particularly relevant anyway. When answering **1(f)(ii)**, many candidates were satisfied after they had referred to just one of the El Nino years, having named the year and stated the amount of catch. Instead they should have continued the search for other evidence from the graphs to support their answer.

Comments on individual questions

Question 1

Answers to part **1(a)(i)** were often no more than a list of places, for which some credit was given, provided that it was based on continents or countries and not just names of oceans. Better answers came from candidates who were able to detect features of the overall pattern, such as all but one of the main fishing areas being located north of the Equator. Most candidates found answering **(a)(ii)** a little easier, most frequently suggesting near to coasts, around islands and on continental shelves as similarities. Northern versus southern hemisphere, even if not as briefly stated as this, was the most frequently suggested difference.

In part **(b)** there were wide variations in candidate performance. Strong candidates packed their answers with real content, particularly for ocean currents and continental shelves. The one disappointment was the general absence of references to named ocean currents. It soon became clear to Examiners that some weaker candidates added more after having answered part **(e)**, but often the additions were of little worth, because they concentrated on warm ocean currents. This only served to emphasise how limited was their understanding. Most answers to **(c)(i)** were accurate, although many fewer marks would have been awarded if Examiners had insisted on the inclusion of the unit (millions). Candidates should be reminded of

the need to state units when working from graphs. In part **(c)(ii)**, some candidates viewed overfishing as synonymous with a lot of fishing. Either they finished their answers having mentioned the rise to the peak in 1987, or having dealt only with the increase during the whole period between 1970 and 2000, (usually worth no marks). Recognising the decrease from the late 1980s was an important requisite for full marks on this section.

Part **(d)(i)** discriminated well between weak candidates, who added little to what was already given to them in the labels on the spider diagram, and able candidates, who could include an example of high technology for locating shoals of fish, and appreciated that larger sized fishing boats and refrigerated factory ships could explore the oceans more widely, staying out at sea and fishing for much longer periods. All the causes were equally capable of generating full mark answers in part **(d)(ii)**. Choice was less important than candidate knowledge and understanding.

With only a moderate amount of understanding, the answers needed for all three parts of **(e)** could be obtained from the two diagrams. However, some candidates failed to realise that in order to establish clear differences in parts **(i)** and **(ii)** their answer needed to be two-sided or comparative. Another common failing was to refer to the differing opportunities for fishing, only to find that they needed to repeat their answers in part **(iii)**. Others interpreted well what the diagrams showed. In some answers it was easy to detect good understanding of El Nino based upon knowledge.

In part **(f)(i)** a few candidates took 1982 and 1983 to be one year and included 1994 as a replacement for one of them. By referring to the El Nino years of 1982 and 1990 in part **(ii)** it was possible for candidates to argue that El Nino events had no or limited effects upon fish catches in Peru, but answers which only followed this route could gain no more than half of the available marks. The evidence for reduced catches was too overwhelming, particularly in the 1990s. The most convincing answers were those in which candidates directly compared catch sizes in El Nino years with those in surrounding years. However, in part **(iii)** the evidence for overfishing was not as definite. Some candidates successfully argued that continually rising catches during the 1990s, except in El Nino years, at significantly higher levels than those in the 1980s, were a sign that overfishing had not occurred. Others noted the large drop in 1994 compared with surrounding years, and argued equally well that this suggested overfishing had occurred. In this question, the strength of supporting evidence mattered more than the opinion taken about overfishing. The least satisfactory answers were those in which candidate opinion was not made clear.

The weakest answers to part **(g)(i)** came from candidates who merely reversed the causes of overfishing from the spider diagram in part **(d)**. These answers were largely worthless, since they were not usually accompanied by any positive strategies for sustainable harvesting of ocean fisheries. Candidates had plenty of strategies to choose from, six or seven of them being named in the syllabus. Quotas, closed seasons and restricted areas for fishing were the ones most frequently used. In order to gain the final mark, candidates needed to write more than just 'strategies' in the centre of their spider diagram. They had to make clear what the strategies were for. Diagrams always need to be free-standing to be effective. Most of the answers given to part **(g)(ii)** failed to reach the expected standard. Here it was difficult to justify 'easy to implement' as the answer, yet many candidates tried to do this. However, they tended to skirt around the real question by spending most of the time describing how implementation of the strategies would reduce overfishing. Those candidates who focused their responses upon the difficulties involved in carrying out the strategies, by reference to fishermen's needs for income and food, international problems of effective policy implementation and the difficulties of monitoring, seemed to have little trouble giving answers worth full or almost full marks. Unfortunately, such answers were the exception.

This question examined a well-known topic, for which most candidates had prepared themselves well. The key to a high mark was consistency of answering between the different parts. Some candidates lost marks by repeating the same or similar answers to more than one part of the question, which suggested a poor focus on the actual question set. This inevitable waste of marks along the way lowered their overall performance.

Question 2

Successful answers to part **(a)(i)** often began with 'in an open area' or similar. Least successful were those that were totally negative, such as 'not in a city', or those which tried to describe the many types of weather (mountain, coast, etc.) that could be recorded here. 'For protection' alone was not a strong enough answer in **(a)(ii)** unless animals or people were mentioned. Thermometers of any type gave an acceptable answer to part **(a)(iii)**. Some candidates answered 'temperature' without naming the weather instrument. Others gave the name of the white box. Barometer was quite a common answer as well. Although, inevitably, there were candidates who confused anemometer with wind vane in **(a)(iv)**, there were many well-drawn and labelled diagrams. Unfortunately, a few candidates drew an excellent diagram of an anemometer, but without name or labels, and could be given very limited reward for their efforts.

Occasionally candidates missed out part **(b)(i)** which was a careless error. Virtually every candidate who attempted the question correctly picked out the highest and lowest temperatures of 34 °C and 16 °C. Despite the guidance in the Station B column, many did not attempt to work out the annual range for Station A, (18 °C), and left the box empty. 'Dry season' was a poor answer to summarise precipitation during the year. Something stronger, such as 'dry all year', was needed. 'Summer' or 'May/June to September' were considered to be superior answers to 'March-September' in **(b)(ii)**. One of the most common answers was 'August', but one month by itself does not make a season. While most candidates correctly selected 'Desert' climate for Station A in **(b)(iii)**, as many, if not more, chose 'Equatorial' climate for Station B. This confirmed the problems that many candidates have with understanding climates. The choice of desert for Station A was easy to explain in part **(b)(iv)** because of the absence of rain, but many of the attempts to explain Savanna for Station B were unconvincing, relying only upon lifting wet and dry season from the table. Much better were responses which either ruled out Equatorial because of the lack of rainfall all year, or used a more complete picture of summer rains and winter dryness with not too much variation in the high temperatures to justify their choice of Savanna climate.

Most candidates were only able to gain half the available marks for part **(c)(i)**. It was clear that less was known about extensive livestock farming than the other three. Few recognised this type of farming as a traditional activity in places too dry for cultivation and little mention was made of the natural adaptation of certain animals such as camels to dry environments. The better answers about new varieties of crops were the ones which were adapted by the candidates to the question theme – stating that the seeds, whether high yielding or genetically modified, had been developed to grow in dry environments. Plenty of not very relevant references to high yielding varieties of rice were seen. 'New varieties' in the question triggered off many barely relevant references to crop rotation, how it works and its advantages. Consistently the best answers were seen for the third option of large dams, even if weaker candidates relied heavily upon 'expensive' for the disadvantage without further elaboration. There were some good answers for trickle drip irrigation, although in some there was over-concentration on underground water supplies at the expense of the irrigation method. Able candidates, with the support of knowledge and understanding, were the only ones to state advantages and disadvantages with precision in this question. In part **(c)(ii)** option **3** was the most popular choice. With relevant comments about amount of water and distance into the future that water supplies were likely to last, many candidates claimed marks. More candidates using option **4** gained full marks than for any of the other options, especially when they concentrated on explaining the advantages of trickle drip over other types of irrigation, and not upon underground water supplies.

Naming a desert, such as the Sahara or a desert region such as the Middle East, was considered insufficient in **(d)(i)**. The most obvious answer was the Sahel or one of the countries within it. Naming appropriate areas within the candidate's home country was also rewarded. However, it was clear in this part, as well as in the next two parts, that many candidates regarded a desert, and an area suffering desertification turning it into a desert, as the same. Physical causes given in part **(d)(ii)** were sometimes no different from the description of a desert climate. There was an absence of reference to drier periods that are longer and more severe than normally expected (i.e. drought). While in general this part was high scoring, because most candidates were clearly familiar with the human causes such as deforestation, overgrazing and over-cultivation, some candidates used the whole answer to explain the difference between physical and human factors without any mention of actual causes of desertification. Total human or total physical answers were equally acceptable in **(d)(iii)** and explanation that matched the view expressed was what mattered. Those who answered along the lines that human causes accelerate natural causes to extend desertification to new areas gave many of the best answers, especially when it was linked to increased population pressure.

There were wide variations in the quality of answer given to part **(e)(i)**. Lack of rain and wind under high pressure conditions to remove the pollutants from the air earned full marks for many. However, from time to time references to inversion of temperature and favourable conditions for the formation of photochemical smog were successfully included in answers. Weakest of all were the totally irrelevant answers about ozone

hole formation and carbon dioxide concentrations leading to global warming. In **(e)(ii)** candidates who chose a vertical scale of 10 squares for 50 days were the ones most certain to draw a fully accurate graph, because all the plotted points fell on graph lines, whereas those who began with 0 at the bottom and 210 at the top made one or more mistakes unless very careful, because only two of the plots were exactly on a graph line. There was an almost equal candidate preference for bar and line graphs. There were a few disasters, caused by candidates using an unequal scale and simply writing in the values from the table to plot at every 5 or 10 grid squares. Over-simple answers, such as 'Decrease' or 'It is declining', failed to gain the mark in **(e)(iii)**. Without reference to days or atmospheric pollution, the trend was not meaningfully described. The result was the careless loss of a mark. The final part, **(e)(iv)**, suffered from too many vague answers, caused by candidate over-reliance upon weak generalisations lacking further support and development. Use of more knowledge of strategies, more money for implementation, more law enforcement and better education in developed than in developing countries generated low marks. Inclusion of actual strategies such as catalytic converters, cleaner fuels and improved public transit systems began to strengthen answers greatly.

ENVIRONMENTAL MANAGEMENT

| Paper 0680/03 |
| Coursework |

General comments

There continues to be a good range of environmental issues chosen by candidates and a deep interest displayed in the environment around them. Candidates who submit coursework benefit by increasing their understanding of how the processes in the Environmental Management specification impinges on their own lives.

Summing up the investigation continues to be the weakest area of the reports with the usual problem of pulling together the issues involved into a strategy for sustainable development, and candidates need more advice on this from the outset of the work.

Centres who allow their candidates to do coursework show a high level of commitment to their candidates with good management of the work and the administration and submission of clear paperwork is appreciated.

Domain A

Candidates were generally good at relating their local problems to the broader aspects of the issue as taught in the specification, but there is more scope for improvement here, some submissions this year being rather thin in their introduction to the issue under investigation.

Domain B

Some Centres continue to carry out group work and there still needs to be more care to ensure that the candidates understand the point of the investigation. There was a feeling that some candidates were working to a formula and were not thinking about the overall impact of what they were doing. It was not always clear from such an approach how much responsibility each candidate had for the work.

Presentation continues to be good and it is clear that this part of the work is carried out with enthusiasm, especially given the increased availability of computer software packages to produce a variety of graphical presentations. The better reports, however, are those which include a detailed written analysis of the data and do not simply allow the "graph to say it all".

Domain C

As said above the strategy for sustainable development of the resource is often extremely weak and candidates need to think about this from the outset, particularly in the early stages when choosing their topic. A strategy is more than a list of possible options and needs an analysis of pros and cons and how the different parties think about the issue. Such strategies usually require compromise and active involvement of interested parties. Again it is often the lack of a recognisable limited resource that lets the investigation down when it comes to the final step of planning for the future.

ENVIRONMENTAL MANAGEMENT

| 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 one African country, South Africa. 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.

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)   The majority of candidates could calculate the loss as 90%, however the second part of this question proved to be a little more demanding, with a wide range of answers other than 2009.

(b)   Candidates often suggested that the rhinos could not defend themselves, a sensible suggestion worthy of credit, however it was also frequently suggested that the rhinos could not kill their prey without a horn. This was not given credit as rhinos are herbivores.

(c)   The majority of candidates suggested sensible questions with well laid out responses. The Examiners do expect to see at least one of the questions with three or four response alternatives (as shown in the question). In **part (ii)** only a minority of candidates gave more than one creditworthy suggestion. There are several acceptable ways of taking a fair sample but unfortunately it was often suggested that all the villagers or only one person from each village should be interviewed.

(d)   Both parts of this question were frequently well answered. In **(i)** the idea that once the local people had ownership of the animals they would prevent over-exploitation was appreciated and expressed in a variety of ways. In **(ii)** the tables were mostly given with sensible headings.

(e)   In **(i)** the local people clearly gained income and some candidates went on to give specific uses to which the money could be put or suggested that poverty could be alleviated. Vague references to improving the standard of living were not given credit. In **(ii)**, most candidates correctly said that the rhinos survive, but many did not mention they would then be able to breed and thus avoid extinction.

Question 2

(a)   Candidates needed to look carefully at the data and most gained both marks for **(i)** and **(ii)**. In **(iii)** there were many completely correct graphs. Future candidates should be reminded that time should be plotted on the *x*-axis (horizontal).

In **(iv)** only a trend that both increase was required to gain the mark. Some candidates gave answers which were too detailed. Detailed descriptions were not required.

In **(v)** a wide range of answers were presented, a minority of which gave the correct answer of 20%.

In **(vi)** a wide range of factors were given but water was often cited, despite the whole point of the trial being to find out if different quantities of water made a difference.

In **(viii)** there were some good suggestions as to how to keep the planting the same. The pod counting proved to be a difficult question to answer as it would not be possible to count all the pods. This meant the candidates needed to suggest a workable method of sampling the pods. In the last part only a minority of candidates referred to measuring the weight or mass of the harvest. This type of question has been asked in the past so the concept of measuring a crop is not thought to be difficult for candidates.

(b)   This question was aimed at candidates presenting a sustainable plan for a farm using some of the information given but adding their own knowledge of environmental management to their plan. In the past these questions have often involved crop rotation, which in this case was inappropriate. This example was specifically set in a dry climatic region without obvious access to significant supplies of water. The Examiners were disappointed to see that often candidates wrote about crop rotation and irrigation without regard for the context given. Very few candidates appreciated that peas are leguminous and fix atmospheric nitrogen thus removing the need for costly fertilisers.

Question 3

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

(a)   Many candidates correctly stated that cyanide was toxic or poisonous. Lung damage was suggested as a risk, but not as frequently as expected.

(b)   Most candidates expressed the idea that more profit could be made.

(c)   The chemical ponds needed to be covered to prevent overflowing during rainfall or animals having contact with the chemicals. Many candidates became worried about evaporation (which would only have lead to loss of water and not the chemicals), which did not gain credit. In **(ii)** there were many good and detailed answers involving infiltration and underground flow leading to pollution of drinking water supplies and/or the river.

(d)   This section considered the impact of development. In **(i)** a wide range of sensible suggestions around employment and increased income were given. In **(ii)** a range of adverse effects were suggested including loss of farmland and specific ideas about types of pollution. Answers just stating pollution without further detail did not gain credit.

In **(iii)** the location away from the village was often correctly stated, as was the risk of contamination of the river in **(iv)**.

(e)   Nearly all candidates improved the layout by moving it further away from the village. A number of other ideas were incorporated and if these were discussed in **(ii)** they gained credit. One mark was given for the drawing, and three explanations compatible with their plan gained the remaining marks.

(f)   Biological monitoring was required to gain credit here. Some candidates referred to taking pH readings. These might remain the same even if the water quality deteriorates. The candidates often suggested monitoring the fish numbers/species, either before and after the mine started work, or upstream and downstream of the mine to check for differences. This gained maximum marks.