

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/11

Paper 11

## Key Messages

The syllabus should be comprehensively covered to ensure candidates do not needlessly lose credit for lack of simple knowledge.

It is important that candidates read the questions carefully.

Command words 'Explain' and 'Suggest reasons' require more than merely stating or describing.

## General Comments

The standard of work was pleasing with good accounts and candidates showing reasonable knowledge across all areas of the syllabus.

The reduction in writing outside spaces noted in previous reports continued this time.

All candidates completed the paper and there was no indication that they were short of time.

## Comments on Specific Questions

### Question 1

- (a) (i) Many candidates found the calculation straightforward and gained full credit.
- (ii) Answers varied, the best candidates understood and explained that while fish were an infinite resource that would be available to future generations, the gold and copper mining was finite and would be relatively quickly exhausted. They then went on to suggest that not only would the minerals run out but that they would destroy the fishery. Weaker answers focused entirely on pollution.
- (b) (i) Most candidates suggested acid rain.
- (ii) Few candidates could describe the effect of acidification on the ecosystem in rivers and lakes. Many wrote about eutrophication, others about the effect of decreased oxygen supplies. There were many references to marine ecosystems.
- (iii) Few candidates stated that wind or rivers may transport acidification across national boundaries.

### Question 2

- (a) (i) and (ii) Some candidates associated the high CO<sub>2</sub> emissions with industrialisation and the use of fossil fuels, gaining partial credit for noting the much higher levels of CO<sub>2</sub> emissions in the North. Many candidates spotted some anomalies in the simple idea of a North/South divide in part (ii)
- (iii) There were a great variety of measures of world poverty and wealth named. These ranged from an excellent understanding of development indicators to vague lists e.g. 'age, region, gender, sex'. It should be noted that a list appears in the syllabus in **section 26.2**.

- (b) (i) Most candidates gained partial credit for describing global warming in terms of temperature change. They were unable to go on and state its recent nature
- (ii) Some candidates failed to state the trend; that ethanol production has increased since 2001. Few candidates referred to greenhouse gas emissions or stated that ethanol is carbon neutral.

### Question 3

- (a) (i) Most candidates identified **A** as pastoralism and **B** as crop farming.
- (ii) Some candidates had an excellent understanding of the differences between extensive and intensive farming. The question twice stat 'extensive and intensive' farming in setting the context, but many candidates discussed subsistence and cash crop farming.
- (b) (i) Many candidates answered this well with a wide variety of correct suggestions being given.
- (ii) Most candidates were able to state two consequences of deforestation. Some candidates inappropriately discussed the effects on global greenhouse gas and oxygen levels.

### Question 4

- (a) (i) Most candidates managed to gain full credit for describing a volcano, with most candidates correctly including the term 'mountain' in their answers.
- (ii) This calculation, applying the scale to the map, proved challenging for many candidates.
- (iii) More candidates correctly counted up the number of towns and cities that would be affected.
- (iv) Some candidates gave brief answers about one reason although the question stated reasons. Many candidates stated as reasons why people live near Popocatépetl: the fertile volcanic soils; tourism; and geothermal power.
- (b) Most candidates understood why there were volcanoes at location **X** on the map. Some candidates correctly made reference to destructive boundaries, convergent plates and subduction zones.

### Question 5

- (a) (i) The majority of candidates plotted a bar graph, with most using an appropriate scale. Some candidates did not label the Y axis.
- (ii) Some candidates were able to gain full credit by linking nearby sea water and the oil wealth of the Gulf countries with desalination plants. Some candidates did not read the question properly and discussed poor countries and water purification.
- (iii) Most candidates made reference to aquifers and underground water. Some candidates wrote about rainwater harvesting and importing water.
- (b) Some candidates correctly explained why there is often better access to safe water in urban areas.

### Question 6

- (a) (i) A few candidates gained full credit but many candidates did not give this straightforward information.
- (ii) Most candidates gained most or full credit, correctly giving the information required by the question.

- (b)(i) and (ii)** Many candidates successfully explained how changes in ozone concentration can affect human health. Most candidates found it much harder to explain how changes in carbon dioxide can affect global temperature. Some candidates wrote short, vague answers that did not include a statement as to whether the nature of the change they were writing about was an increase or decrease.
- (iii)** Some candidates realised the question was about CFC's and the ozone layer, gaining credit. Other candidates wrote too generally about pollutants and gained little or no credit.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/12

Paper 12

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## Comments on Specific Questions

### Question 1

- (a) (i) Most candidates correctly filled in the pie chart and key.
- (ii) Most candidates correctly made two suggestions, but other candidates could give only one, or gave incorrect choices.
- (b) (i) Most candidates correctly suggested acid rain for the type of pollution.
- (ii) Most candidates gained at least partial credit. A wide range of suggestions was accepted.

### Question 2

- (a) (i) Most candidates were able to gain partial credit on this question. A few candidates were able to gain full credit by giving accurate descriptions of the distribution of the minerals with reference to the type of rock (old or young) and whether the mineral was localised or widespread.
- (ii) Candidates gave a wide range of good suggestions as to the reasons for the dangers of mining as a job. Some candidates incorrectly discussed the wider dangers of mining for which they did not gain credit.
- (b) Most candidates gained at least partial credit, concentrating correctly on the economic advantages and disadvantages of mining. Some candidates incorrectly included advantages that were not economic and for this they did not receive credit.

### Question 3

- (a) (i) Most candidates gained at least most of the credit available, but definitions of niche were often vague or incorrect and thus did not gain credit.
- (ii) This material is well understood by almost all candidates. Candidates made a wide range of excellent suggestions as to the adaptations that desert plants to their environment.
- (b) Few candidates were able to gain all of the credit for this question. Many candidates did not carefully read the stem which asked for possible effects on *natural ecosystems* and therefore incorrectly discussed advantages and disadvantages for farmers.

### Question 4

- (a) (i) Most candidates gained full credit for this calculation. Some candidates did not read the question carefully enough and left out the 'billion' from their answer, giving the answer as 0.042 km<sup>3</sup> as opposed to 0.042 billion km<sup>3</sup>.
- (ii) The majority of candidates were able to gain full or partial credit for straightforward explanations of the water cycle.
- (b) (i) Most candidates gained credit for this question.
- (ii) Most candidates suggested either **A** or **C**. A few candidates were able to give a good reason for their choice.
- (iii) There were many good suggestions as to the disease and correct indications of its type. Fewer candidates gained credit for correctly stating methods of control.

### Question 5

- (a) (i) Most candidates suggested both sunlight and chlorophyll as the missing parts of the equation, gaining full credit. Chlorophyll was more frequently missed than sunlight in gaining partial credit.
- (ii) Many candidates suggested minerals. Some, too vaguely, suggested the word nutrients, which was unacceptable in this context.
- (iii) Some candidates gained full credit for writing the names of the organisms in the correct order with arrows for the energy flow between them, from the producer (trees) to the consumers in the correct sequence. Some candidates wasted large amounts of time drawing pictures of the organisms. This was not penalised if they were in the correct order and arrows showing energy flow went in the correct direction. Some candidates copied out large chunks of the food web for which there was no credit.
- (b) Some candidates answered this well and gained full credit. Many candidates missed the need to deal with both living and non-living environments.

### Question 6

- (a) (i) Most candidates were able to suggest an appropriate answer to this question. Other candidates gave a wide variety of incorrect responses.
- (ii) A few candidates gave specific answers referring not just to 'improved water availability' but also to what the water is actually being used for, e.g. irrigation. Such answers gained credit while other vague answers did not.
- (iii) The credit here was for specific references to the environmental management issues that come from large dam construction, and a few candidates gained full credit. Other candidates made vague references to destruction of habitats, for example, which were not credited.

- (b) (i)** This question contains a type of spider diagram which was clearly familiar to many candidates who thus gained partial or full credit. Other candidates were clearly not familiar with such diagrams, which are routinely used in environmental management, and, for example, failed to gain credit after adding to the existing resources (desalination & tourism) rather than adding new resources.
- (ii)** Some candidates gained full or partial credit in this part of the paper. Candidates who put 'fishing' or similar as a resource in **(b) (i)** were most easily able to gain credit in this question.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/13

Paper 13

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- (b)(i)** This question contains a type of spider diagram which was clearly familiar to many candidates who thus gained partial or full credit. Other candidates were clearly not familiar with such diagrams, which are routinely used in environmental management, and, for example, failed to gain credit after adding to the existing resources (desalination & tourism) rather than adding new resources.
- (ii)** Some candidates gained full or partial credit in this part of the paper. Candidates who put 'fishing' or similar as a resource in **(b)(i)** were most easily able to gain credit in this question.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/21

Paper 21

## Key messages

Read the questions carefully; read each question more than once; underline key question words, such as the command words, words which tell candidates what to do.

Take careful note of the number of marks for the question. For 3, 4 and 5 mark questions it is not just matter of filling all the lines; it is highly likely that a variety of points need to be made, or details about an example given, rather than just repeating one idea.

Avoid over-using vague terms such as 'pollution'. Always specify the type of environmental pollution by at least adding air, water or land before it as well as something about its nature and origin e.g. when referring to pollution from a damaged oil rig, do not just write 'pollution', but preferably write something more detailed e.g. 'water pollution by oil from a damaged rig'.

## General comments

**Question 1** and **Question 2** were, overall, of similar difficulty to candidates.

There was no evidence of lack of time for candidates of all abilities.

Questions which were generally well answered by candidates included **1(a)(i)** and **(ii)** (using the Demographic Transition Model), **1(b)(iv)** (drawing the line graph), **2(a)(i)** and **(ii)** (using the information about access to clean water in some world regions) and **2(b)(i)** and **(ii)** (about water-related diseases).

In contrast, the questions which proved to be more difficult than average for the majority of candidates included **1(e)(i)** and **(ii)** (unsustainable world population growth), and **2(a)(iii)** (reasons for different rates in improvement in access to clean water between developing world regions).

Questions which suffered from limited candidate coverage in relation to number of marks available included **1(b)(i)**, **1(d)(iv)** and **2(d)(i)**.

Many questions required the use of resource information supplied. The better the candidate *used* the sources, the more likely the success of the answer. Question instructions most frequently ignored were describing from the graph as well as the data in **1(b)(v)** and explaining in the context of 'After the construction of the dam ..' in **2(d)(iii)**.

Using the data provided and what the candidate's own line graph showed in **1(b)(iv)** were needed for answering **(b)(v)** well; only a minority *used* (rather than repeated) data from the table, as well as describing what the shape of the line in the graph showed.

Similarly, in the best answers to **2(d)(iii)** and **(iv)** it was clear that candidates had made a careful study of all comments before starting to write their answers. Answers to **2(d)(i)** could only be based upon the resource map supplied. A careful study of the map was needed, following the rivers southwards from their sources in the Himalayas. Without having done this, some candidates focused their attention and answers on rivers and cities to the south of the Tehri Dam, neither of which had any relevance to the question.

## Comments on specific questions

### Question 1

Most candidates gave at least one of the correct stages and many understood the Demographic Transition Model well enough to give both.

In **(a)(ii)** most candidates gained credit for correctly giving similarities and differences between the stages..

Question **(a)(iii)** placed a greater demand on understanding. Many candidates correctly showed natural increase in stages 2 and 3 and natural decrease in stage 5, even if the shading was not always confined to the spaces between the lines for birth rate and death rate. .

In part **(b)(i) most** candidates showed a basic understanding of how the factors in the spider diagram could decrease a country's rate of population growth, gaining partial credit. Few candidates elaborated more fully upon each basic statement in order to gain full credit. For example, there were many partial credit answers along the lines that 'with better education women had greater awareness of methods of family planning', without incorporating another aspect associated with education of women, such as encouraging later marriages or becoming more career orientated which were required for full credit.

In part **(ii)** most candidates gained partial credit by answering the 'why' part of the question. Some candidate did not attempt to answer the 'how' half of the question as well.

In **(b)(iii)** the correct answer was given by most candidates.

A few candidates encountered problems plotting the data for fertility rates using a line graph in **(b)(iv)** although most gained full credit. The occasional inaccuracy in plotting led to some answers gaining partial credit. The most common reason for no credit was drawing bar graphs, which also consumed more time.

Most answers to **(b)(v)** gained only partial credit. The main reason for not gaining full credit was that candidates used data only to describe, without any obvious references to the graph as well, as demanded by the question. The best answers suggested, for example, that the decline in fertility rate was fastest (at 3.1) in the 1990s, shown by the noticeably steeper gradient of the line on the graph.

Part **(b)(vi)** demanded more understanding. It was pleasing that many candidates linked fast decrease during the 1990s back to the earlier box information about contraception being more widely available. Full credit was given to candidates who recognised the greater population stability, associated with a fertility rate of 2.1 (stable population replacement fertility rate) after social attitudes to population numbers had changed.

Most candidate's answers to part **(c)** began with a sentence about the how national population policies in general can affect a country's population growth. This was followed by reference to a country with a population policy. China was the dominant choice. Next a country without a population policy was named as a contrasting example. For this the choice of country was wider, but it was often the candidate's home country. This was a sensible choice since it made it more likely that the candidate would be able to give meaningful elaboration. The amount of credit awarded reflected the amount and accuracy of the supporting detail. Less credit was awarded for the smaller number of general answers without any named countries, or no more than passing references to a country without any more information about it. In a few cases Japan was obviously being confused with China. There were very few answers in which there was no discernible knowledge of what was meant by a national population policy.

In part **(d)(i)**, most candidates knew how to work out natural increase and gave the correct answer of 15.1. The few candidates who did not know how to do this typically restated the birth rate from the table.

Most candidates suggested either stage 2 or stage 3 in their answers to **(d)(ii)**. There was no credit for naming the stage. Many candidates gained partial credit for a simple explanation which matched the stage chosen. Full credit was given to some candidates who showed very clearly that they had studied the birth and death rates for Iran in relation to the earlier diagram of the Demographic Transition Model. Some did this by comparing the size of the birth and death rates per 1000 with those in the graph; others did it by explaining why it could not be the other stages such as stages 1 or 4. A few candidates suggested a stage that was clearly wrong such as 4 or 5, or avoided answering the question.

In general the answers for 'environmental' in part **(d)(iii)** were better than those for 'economic'. Many candidates mentioned unemployment as an economic pressure. Some others described economic

pressures for the provision of essential services. Deforestation was the most common starting point for the environmental effects. The amount of credit was determined by the amount of detail given in the descriptions.

In part **(e)(i)** and **(e)(ii)**, for those taking the unsustainable view, the most credit-worthy answers came from candidates who concentrated on the pressure of population growth upon the Earth's natural resources. Less credit was awarded to those who pursued the theme of environmental damage (perhaps following on from the previous part of the question), sometimes without any mention of natural resources. Little credit was earned by entirely demographic answers about controlling population growth because most or all of their content was irrelevant. Only a few candidates took the alternative view that world population growth could be sustainable due to further increases in technology, leading to a switch in dependence from non-renewable to renewable energy sources and to higher food output from GM crops and other new seeds. Full credit was possible for those taking this viewpoint. In either case, the amount of credit reflected the amount and precision of the supporting detail. Overall, the highest credit in part **(e)** was earned by those candidates who had the understanding, as well as the knowledge, to give answers that were focused on what the question was about.

Overall in **Question 1** what discriminated most between answer quality and candidate performance was the amount of supporting detail in the questions worth 4 marks or more, notably **(b)(i)**, **(c)**, **(d)(iii)** and **(e)**.

## Question 2

In answers to part **(a)(i)** many candidates gained full credit. Among candidates who made one or more mistakes, careless reading of the question rather than an inability to read and understand the graph appeared to be the greater problem. For example, Middle East was the most common incorrect answer to number 3, most likely because the candidate had not homed in on the key question words 'greatest' and 'increase'.

Most candidates gained credit for correctly stating one of the two differences between the Middle East and the four other regions for the mark in **(ii)**.

In part **(iii)** the question actually set was about differences in rates of improvement between developing world regions. Many answers gained little credit as they were incorrectly about differences between developed and developing countries. A few candidates gave answers correctly focused on differences in wealth and levels of economic development between industrialising South east Asia and oil rich countries in the Middle East, compared with the economic stagnation and political instability in Sub-Saharan Africa.

Both cholera and typhoid needed to be separated out from the other diseases for credit in **(b)(i)** to be awarded, as was successfully done by many candidates. This left bilharzia (water-based using the syllabus description) and malaria (water-bred) to be described in **(b)(ii)**. Most candidates gained full credit here. Partial credit was gained by a few candidates in the second part (following a partly correct answer in the first part) for accurate description of either bilharzia or malaria.

The answers to part **(b)(iii)** that gained most credit came from candidates who acted on the question requirement to identify people and groups of people. By including references to poor people, people in rural areas, young and old people such candidates were able to offer a range of different reasons for the high risks from water-related diseases. Partial credit was gained by more general answers about developing countries and their lack of access to clean water, which had been referred to at the start of **Question 2**. Without references to people, candidates found it difficult to earn much credit.

What was most likely to be included in the flow diagram about family poverty in **(b)(iv)** was 'too weak to work' followed by 'less food grown' or 'less income' (or similar), gaining full credit. All other reasonable possibilities were accepted, provided that they followed and continued the sequence to lead into family poverty. A significant number of candidates used 'unable to afford medical treatment' or similar in the first box, followed by 'unable to work' in the second box, again gaining full credit. A minority of candidates who put 'people die' in the first box, struggled to keep the flow going in the second box to lead into 'family poverty'; thus gaining partial credit. Some such candidates referred in the second box referred to the problems for their survivors and gained full credit. Most candidates gained full credit.

Most candidates used the information given in the report to answer part **(c)(i)** and gained most or all of the credit available.

The best answers to **(c)(ii)** were given by those who used a logical order to describe, basically beginning with the solar panel driving the motor and working towards the storage and distribution. Candidates who did not adopt this approach tended to give incomplete answers and gain only partial credit.

In **(c)(iii)** some candidates gained most or all of the credit by referring to both sustainable (usually renewable energy source and water store topped up by tropical rains) and unsustainable (possible mechanical breakdown and water overuse) aspects of the solution. Some candidates tried to base their responses purely around the word 'sustainable' without deeper consideration, gaining only partial credit. For example, solar power was stated as sustainable without any further explanation as to what made it sustainable, such as being a renewable energy source given that sunlight is natural and is always going to be available.

The answers to **(d)(i)** that gained most credit were based on what was shown in the map and what could be interpreted from it, using knowledge from the syllabus about large dams. Such answers, for example, suggested that the Himalayas, shown with peaks above 7000 metres high, would be a very large water source from high rainfall or ice and snow melt. These answers also noted that, being so close to land above 2000 metres it was also likely that river valleys would be deep and steep. Finally, such answers suggested that the confluence of two rivers just above the dam position reinforces either of the preceding ideas. Many candidates gained partial credit for partial answers containing some of these ideas. Some candidates gained full credit for more complete answers.

Full credit was achieved by many candidates in **(d)(ii)**.

When answering part **(iii)**, the candidates who gained most credit appreciated the question context of 'after the construction of the dam'. Such answers included references to both economic and social disadvantages, gaining only partial credit if one or other was omitted. The candidates who gained most credit normally added explanatory comments to the statements made by villagers. Some other candidates assumed that the question was about displacement of local people to allow dam construction and thus earned little or no credit.

In **(d)(iv)** most credit was awarded to candidates who used information from the comment by the government official and integrated this with understanding gained from having studied examples of large dams elsewhere. Partial credit was gained by candidates who, having realised that the government official's comment was the starting point, were then unable to take the explanation further.

Part **(d)(v)** generated a wide range of answers, most supporting the view. Some candidates moved the discussion away from water supply issues in Delhi and concentrated either on urban problems in Delhi that had been made worse, or on the risks from reduced food output in rural areas, gaining full credit. Many candidates gained little or no credit for discussions about water supply in Delhi. A few candidates gained credit for opposing the view by arguing that urban areas were better placed for economic growth than rural areas. Such candidates pointed out that essential services could be provided more cheaply and easily than in remote rural areas.

Many candidates showed in **(d)(vi)** that they understood how a reduction in the volume of river water led to higher concentrations of pollutants, gained much of the credit. Some of these candidates gained full credit for further detail, either by looking for other possible sources of pollutants such from an extension of farming after irrigation, or by examining the consequences of reduced water flow in more detail. Little credit was gained by candidates who relied heavily upon the source information so that any elaboration was limited.

Overall the standard of answers given to **Question 2** was comparable with that for **Question 1**. Again, the longer questions proved more demanding for less well prepared candidates.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/22

Paper 22

## Key messages

Longer answers usually need to be supported by elaboration; longer answers may also require examples; always be guided by the number of marks as to the amount of detail needed.

Read each question more than once; underline key question words, especially the command words, the words that tell candidates what to do.

Make sure that all parts of the question are covered in the answer.

Do not begin by repeating the question. Sometimes this filled the first two lines of the answer. Begin the answer straight away. This makes it more likely that a full answer to the question has been given by the time all the lines for answering have been filled.

## General comments

**Question 1** and **Question 2** were, as usual, overall, of similar difficulty to candidates - in this paper, question 2 was very slightly easier.

Question instructions most frequently ignored in this examination were: **1(a)(iii)** 'Describe what the graph shows' - instead reasons were given for the importance of oil; and **2(a)(ii)** 'Describe how the percentage distribution of urban population' - instead the growth of urban population was described.

Questions in this examination which suffered most from limited coverage were: **2(b)** - high rates of natural increase or large scale rural to urban migration were omitted; and **2(c)(ii)** - advantages or disadvantages were not referred to.

Candidates were most comfortable with all the questions in **1(c)** (pages 4 and 5), and in **2(d)–(f)** (pages 12 to 15). Parts of **1(e)** and **(f)** proved to be more challenging.

Candidates gained most credit if they: attempted all the questions; gave as much attention to the last question as to the first; kept a careful eye throughout on question wording and the number of marks; attempted to elaborate upon and explain their basic answers to questions; made frequent references to appropriate examples.

## Comments on specific questions

### **Question 1**

Many candidates correctly gave the total world energy demand in **(a)(i)**. Other candidates' careless reading of the question led to some candidates incorrectly giving the total value for oil in 2010 for which they received no credit.

In **(a)(ii)** Many candidates gave the correct answer with very few incorrect answers.

There were some really good answers to part **(a)(iii)** from candidates who focused both on describing from the graph, and on the question theme of the importance of oil. Not only did such candidates realise that oil was the most used individual energy source at all three dates, but they also recognised that its relative importance within the total was declining as use of other sources increased. Sometimes such candidates used ratios or percentages in support as a way of relating amount of oil used to total world energy demand.

Less credit was given to other candidates who concentrated on the increased use of oil and used values from the graph in support. Most candidates gave the bare minimum graph description and relied too heavily on vague statements unsupported by graph evidence, gaining only partial credit. A few candidates referred to total energy demand rather than oil, which usually resulted in no credit being awarded.

Full credit was given in **(b)(i)** for some candidates who referred to petrol and diesel as the basis for most modern forms of land and sea transport, followed by one of its many advantages for transport over other energy sources, such as its cheapness, ease of use as a liquid, or the fact that modern forms of transport have been developed to run on oil based fuels. Many candidates concentrated instead on the great increase in transport worldwide and did not cover the main material of the question gaining, at best, partial credit.

Most candidates gained credit in **(b)(ii)** by establishing that more alternatives were available that were suitable for generating electricity. Some of these answers were continued by giving advantages of using alternatives such as lower levels of air pollution gaining full credit. The importance of coal in generating electricity in many countries was widely known by candidates.

Many candidates gained full credit in **(c)(i) – (c)(iii)**. Some candidates incorrectly labelled ‘hole in the ozone layer’ instead of global warming in part **(i)**, gaining no credit.

In **(c)(iv)**, most candidates understood what the question wanted and gained most or all of the credit by explaining in the same order as in the question, namely local, then international, and finally global effects. Other candidates took a less organized approach and gained less credit.

In **(c)(v)** virtually all candidates, in their own words, emphasised how greatly traffic emissions can be reduced by using buses instead of cars and recognised that the government of Dubai wanted people to give up their cars and travel by public transport.

‘Another way’, other than public transport, was needed in part **(c)(vi)**. The most popular choice was catalytic converters on vehicle exhausts; there was a good level of knowledge about how these worked to reduce dangerous emission giving many candidates full credit. Use of cleaner fuels such as compressed natural gas (CNG) was another popular choice through which some candidates gained full credit. Some other candidates referred to traffic management schemes, such as restrictions on city car entry or car use.

A good choice of city or country in **(d)(i)**, allowed specific and detailed answers to **(d)(ii)**. Many such candidates were able to gain full credit by giving precise reasons, including both physical and human, for the notoriously high levels of air pollution in the selected city. The choice of Los Angeles, for example, led many candidates for gain all or most of the credit as candidates referred to high levels of car ownership, dry climate dominated by high pressure and regular temperature inversions, and lowland relief surrounded by mountains. The choice of China, or a major city within the candidate’s own country permitted other candidates to gain most of the available credit. In such answers, the details given clearly matched the choice of city, but a common omission was lack of a reference to a physical factor favouring air pollution. Answers with limited coverage, or with a mis-match between reasons given and the choice of city or country were worth less credit.

In **(e)(i)** many candidates made it clear, either from a statement or from values quoted from the graph, that they knew that oil, coal and natural gas were the three fossil fuels. For such candidates, all relevant statements could then be credited. Many of these candidates did in fact make productive use of the graph of world energy demand, for example, giving percentage contributions to the total from fossil fuels which showed a progressive decline from 1990 to 2030. Some candidates were unable to identify the fossil fuels and gained no credit. Some answers were about all the energy sources in the table, others were about oil only. A few included references to only two of the three fossil fuels and could gain only partial credit.

In **(e)(ii)** candidates gained credit for drawing a line at 75 from top to bottom in the graph. Shorter vertical lines at 75 were also given credit. Some candidates gained no credit either by leaving the graph blank or by giving incorrect or ambiguous marks on the graph.

Question **(e)(iii)** proved, as anticipated, demanding for many candidates. Full credit was gained by candidates who understood the idea, referring to factors such as location, ease of access, costs of labour and materials, and technology and its availability. Some of the answers about wind power were, incorrectly, more about day to day variations in wind availability rather than variable long-term suitability of locations for high and regular wind speeds. Many answers based on nuclear power were about local raw material supplies, which only form a very small proportion of the total costs of nuclear power generation.

Some of the answers to **(e)(iv)** were given without any references to the graph during the discussion of possibilities for more wind and nuclear use. These answers were given partial credit because the question asked for use of knowledge as well as the graph. Some candidates showed that they understood that from the graph, only onshore wind could be competitive with oil at a world price of \$75 per barrel. Such candidates were in a strong position to answer the question, whatever their view about how likely it was that new wind and nuclear power stations would be built and such answers gained most or all of the available credit. A view expressed as 'unlikely' led to answers dominated by economic reasoning. A view expressed as 'likely' tended to be based on other factors, such as less polluting and longer lasting.

Most candidates gained credit in **(f)(i)**.

In **(f)(ii)** candidates who stated first the assessments which meant that it could not be wind (such as being weather dependent) and oil (such as emissions of carbon dioxide) gained credit. The candidates who then added to the information already given to explain why it was nuclear power (such as not fully sustainable because uranium is needed or not safe because of radiation) gained more credit up to the maximum available. Candidates, who re-stated without explanation or elaboration, the terms given in the Energy assessment table, gained little or no credit.

## Question 2

Most candidates gained credit in **(a)(i)** with an answer of 1990-2010. Those who did not gain credit typically stated only one of the dates (1990 or 2010) rather than the 20 year period asked for.

There were many clear, precise answers to **(a)(ii)** supported by the use of key percentages gaining much credit. Some candidates made it clear that the higher percentage of urban population that had existed in developed countries in 1950 had been replaced by a much higher percentage concentration in developing countries in 2010, gaining full credit. Other candidates lost credit by never actually mentioning the term 'urban' when referring to the population. Reasons for the changes gained no credit as they were irrelevant because the question asks for a description rather than an explanation.

Plotting the world population totals correctly for the three dates in part **(iii)** earned credit for almost all candidates. Most candidates gained credit for plotting the urban populations although some made errors and so did not gain full credit.

Partial credit for answers 'urban growth' were more common than full credit answers 'increased percentage of the population living in urban areas' in part **(a)(iv)**, even though candidates had just plotted these percentages on the graph. Once again there were quite a number of answers in which 'urban' was never mentioned, reducing the potential credit.

Candidates had plenty of choice of content for answering part **(b)**. Those candidates who included natural increase and migration, developing and developed in their answers had little trouble gaining full credit. Many candidates were familiar with reasons for high birth rates and rural to urban migration in developing countries. Some candidates made no reference to one of either natural increase or to rural to urban migration which limited credit. A few candidates misread the question and referred to push and pull factors for migration from developing to developed countries which limited credit. Others who correctly addressed both question themes referred only to what was happening in developing countries, ignoring differences with developed countries again limiting credit available.

For the mark in **(c)(i)** the letter **S** needed to be placed in one of the obviously empty spaces, on either side of the river, or on the slopes beyond the factories.

For a full explanation in **(c)(ii)** candidates needed to mention at least one advantage and one disadvantage. Some candidates referred to one without the other, limiting credit. Most of credit-worthy answers were explanations of the advantages and disadvantages of living near the river or near the factories. Stating 'near the factories' as an advantage needed to be qualified by its significance, for example in terms of nearness for finding a job, or low transport costs to reach work in order to gain credit.

In, **(d)(i)** and **(d)(ii)**, candidates were expected to select appropriate answers from the newspaper report, adding some additional comment towards the description of 'stable low-income neighbourhood' in **(ii)**. Most candidates gained all or most of the credit.



In **(d)(iii)** many candidates had few problems identifying and isolating two reasons for the big change, such as the Workers Party, supportive NGOs and local businesses, and police clearing out drug dealers. Some candidates gained little credit for continuing with the same answers as part **(ii)**.

In part **(e)(i)**, answers based on deforestation and high levels of pollution were most common. Differences in credit mainly reflected amount of elaboration, and degree of precision about the types of pollution and their effects. Many candidates concentrated on identifying three different types of environmental damage, with nothing more than a basic statement about each one, gaining only partial credit. Some candidates gave more context to their examples as well as content, gained more credit. References to pollution were only effective when the type of pollution was specified. Some candidates narrowly named only air, water and land pollution, mostly then giving answers that were short on real detail, thus limiting the amount of credit available.

Pleasingly, many candidates gained full credit in part **(e)(ii)** for expressing the idea that when a population increases, its carbon dioxide emissions can be expected to increase as well, the opposite of what has happened in Freiburg – however that understanding is expressed. Some candidates did no more than state what the graph showed, for both population and carbon dioxide and these were given partial credit.

There were plentiful choices on the map for candidates to describe in **(f)(i)**. When describing such material, candidates need to go beyond stating the terms seen on the map and in the question, such as eco-friendly, renewable and sustainable, in order to gain credit. Most candidates had sufficient understanding to gain at least partial credit for each of their chosen characteristics. Full credit was given to candidates who described more fully, as demanded in the question.

A wide range of options for dealing with urban wastes were named and explained in **(f)(ii)**. Some candidates worked from the trigger on the sketch and referred to waste water treatment first. Others began with recycling. Many of those who referred to landfill went out of their way to describe how the operations could be made more sanitary. The range and amount of content were the main determinants for the amount of credit given. Some answers stopped short of what was needed for full credit. A few candidates referred to methods of waste disposal forgetting that they were supposed to reduce environmental impacts, limiting the credit available. Answers from such candidates were typically landfill based. Taking the rubbish well away from the eco-city to be dumped is not an environmentally friendly solution and could earn no credit.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/23

Paper 23

## Key messages

Longer answers usually need to be supported by elaboration; longer answers may also require examples; always be guided by the number of marks as to the amount of detail needed.

Read each question more than once; underline key question words, especially the command words, the words that tell candidates what to do.

Make sure that all parts of the question are covered in the answer.

Do not begin by repeating the question. Sometimes this filled the first two lines of the answer. Begin the answer straight away. This makes it more likely that a full answer to the question has been given by the time all the lines for answering have been filled.

## General comments

**Question 1** and **Question 2** were, as usual, overall, of similar difficulty to candidates - in this paper, question 2 was very slightly easier.

Question instructions most frequently ignored in this examination were: **1(a)(iii)** 'Describe what the graph shows' - instead reasons were given for the importance of oil; and **2(a)(ii)** 'Describe how the percentage distribution of urban population' - instead the growth of urban population was described.

Questions in this examination which suffered most from limited coverage were: **2(b)** - high rates of natural increase or large scale rural to urban migration were omitted; and **2(c)(ii)** - advantages or disadvantages were not referred to.

Candidates were most comfortable with all the questions in **1(c)** (pages 4 and 5), and in **2(d)–(f)** (pages 12 to 15). Parts of **1(e)** and **(f)** proved to be more challenging.

Candidates gained most credit if they: attempted all the questions; gave as much attention to the last question as to the first; kept a careful eye throughout on question wording and the number of marks; attempted to elaborate upon and explain their basic answers to questions; made frequent references to appropriate examples.

## Comments on specific questions

### **Question 1**

Many candidates correctly gave the total world energy demand in **(a)(i)**. Other candidates' careless reading of the question led to some candidates incorrectly giving the total value for oil in 2010 for which they received no credit.

In **(a)(ii)** Many candidates gave the correct answer with very few incorrect answers.

There were some really good answers to part **(a)(iii)** from candidates who focused both on describing from the graph, and on the question theme of the importance of oil. Not only did such candidates realise that oil was the most used individual energy source at all three dates, but they also recognised that its relative importance within the total was declining as use of other sources increased. Sometimes such candidates used ratios or percentages in support as a way of relating amount of oil used to total world energy demand.

Less credit was given to other candidates who concentrated on the increased use of oil and used values from the graph in support. Most candidates gave the bare minimum graph description and relied too heavily on vague statements unsupported by graph evidence, gaining only partial credit. A few candidates referred to total energy demand rather than oil, which usually resulted in no credit being awarded.

Full credit was given in **(b)(i)** for some candidates who referred to petrol and diesel as the basis for most modern forms of land and sea transport, followed by one of its many advantages for transport over other energy sources, such as its cheapness, ease of use as a liquid, or the fact that modern forms of transport have been developed to run on oil based fuels. Many candidates concentrated instead on the great increase in transport worldwide and did not cover the main material of the question gaining, at best, partial credit.

Most candidates gained credit in **(b)(ii)** by establishing that more alternatives were available that were suitable for generating electricity. Some of these answers were continued by giving advantages of using alternatives such as lower levels of air pollution gaining full credit. The importance of coal in generating electricity in many countries was widely known by candidates.

Many candidates gained full credit in **(c)(i) – (c)(iii)**. Some candidates incorrectly labelled ‘hole in the ozone layer’ instead of global warming in part **(i)**, gaining no credit.

In **(c)(iv)**, most candidates understood what the question wanted and gained most or all of the credit by explaining in the same order as in the question, namely local, then international, and finally global effects. Other candidates took a less organized approach and gained less credit.

In **(c)(v)** virtually all candidates, in their own words, emphasised how greatly traffic emissions can be reduced by using buses instead of cars and recognised that the government of Dubai wanted people to give up their cars and travel by public transport.

‘Another way’, other than public transport, was needed in part **(c)(vi)**. The most popular choice was catalytic converters on vehicle exhausts; there was a good level of knowledge about how these worked to reduce dangerous emission giving many candidates full credit. Use of cleaner fuels such as compressed natural gas (CNG) was another popular choice through which some candidates gained full credit. Some other candidates referred to traffic management schemes, such as restrictions on city car entry or car use.

A good choice of city or country in **(d)(i)**, allowed specific and detailed answers to **(d)(ii)**. Many such candidates were able to gain full credit by giving precise reasons, including both physical and human, for the notoriously high levels of air pollution in the selected city. The choice of Los Angeles, for example, led many candidates for gain all or most of the credit as candidates referred to high levels of car ownership, dry climate dominated by high pressure and regular temperature inversions, and lowland relief surrounded by mountains. The choice of China, or a major city within the candidate’s own country permitted other candidates to gain most of the available credit. In such answers, the details given clearly matched the choice of city, but a common omission was lack of a reference to a physical factor favouring air pollution. Answers with limited coverage, or with a mis-match between reasons given and the choice of city or country were worth less credit.

In **(e)(i)** many candidates made it clear, either from a statement or from values quoted from the graph, that they knew that oil, coal and natural gas were the three fossil fuels. For such candidates, all relevant statements could then be credited. Many of these candidates did in fact make productive use of the graph of world energy demand, for example, giving percentage contributions to the total from fossil fuels which showed a progressive decline from 1990 to 2030. Some candidates were unable to identify the fossil fuels and gained no credit. Some answers were about all the energy sources in the table, others were about oil only. A few included references to only two of the three fossil fuels and could gain only partial credit.

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## Question 2

Most candidates gained credit in **(a)(i)** with an answer of 1990-2010. Those who did not gain credit typically stated only one of the dates (1990 or 2010) rather than the 20 year period asked for.

There were many clear, precise answers to **(a)(ii)** supported by the use of key percentages gaining much credit. Some candidates made it clear that the higher percentage of urban population that had existed in developed countries in 1950 had been replaced by a much higher percentage concentration in developing countries in 2010, gaining full credit. Other candidates lost credit by never actually mentioning the term 'urban' when referring to the population. Reasons for the changes gained no credit as they were irrelevant because the question asks for a description rather than an explanation.

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Candidates had plenty of choice of content for answering part **(b)**. Those candidates who included natural increase and migration, developing and developed in their answers had little trouble gaining full credit. Many candidates were familiar with reasons for high birth rates and rural to urban migration in developing countries. Some candidates made no reference to one of either natural increase or to rural to urban migration which limited credit. A few candidates misread the question and referred to push and pull factors for migration from developing to developed countries which limited credit. Others who correctly addressed both question themes referred only to what was happening in developing countries, ignoring differences with developed countries again limiting credit available.

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In, **(d)(i)** and **(d)(ii)**, candidates were expected to select appropriate answers from the newspaper report, adding some additional comment towards the description of 'stable low-income neighbourhood' in **(ii)**. Most candidates gained all or most of the credit.

In **(d)(iii)** many candidates had few problems identifying and isolating two reasons for the big change, such as the Workers Party, supportive NGOs and local businesses, and police clearing out drug dealers. Some candidates gained little credit for continuing with the same answers as part **(ii)**.

In part **(e)(i)**, answers based on deforestation and high levels of pollution were most common. Differences in credit mainly reflected amount of elaboration, and degree of precision about the types of pollution and their effects. Many candidates concentrated on identifying three different types of environmental damage, with nothing more than a basic statement about each one, gaining only partial credit. Some candidates gave more context to their examples as well as content, gained more credit. References to pollution were only effective when the type of pollution was specified. Some candidates narrowly named only air, water and land pollution, mostly then giving answers that were short on real detail, thus limiting the amount of credit available.

Pleasingly, many candidates gained full credit in part **(e)(ii)** for expressing the idea that when a population increases, its carbon dioxide emissions can be expected to increase as well, the opposite of what has happened in Freiburg – however that understanding is expressed. Some candidates did no more than state what the graph showed, for both population and carbon dioxide and these were given partial credit.

There were plentiful choices on the map for candidates to describe in **(f)(i)**. When describing such material, candidates need to go beyond stating the terms seen on the map and in the question, such as eco-friendly, renewable and sustainable, in order to gain credit. Most candidates had sufficient understanding to gain at least partial credit for each of their chosen characteristics. Full credit was given to candidates who described more fully, as demanded in the question.

A wide range of options for dealing with urban wastes were named and explained in **(f)(ii)**. Some candidates worked from the trigger on the sketch and referred to waste water treatment first. Others began with recycling. Many of those who referred to landfill went out of their way to describe how the operations could be made more sanitary. The range and amount of content were the main determinants for the amount of credit given. Some answers stopped short of what was needed for full credit. A few candidates referred to methods of waste disposal forgetting that they were supposed to reduce environmental impacts, limiting the credit available. Answers from such candidates were typically landfill based. Taking the rubbish well away from the eco-city to be dumped is not an environmentally friendly solution and could earn no credit.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/03

Coursework

## General comments

A good range of environmental issues were chosen by candidates, although some should have given more thought to sustainability issues in order to gain better marks for Domain C.

Most Centres provided excellent comments to support their marking; this was much appreciated as it helped to see where credit had been awarded.

## Comments on specific questions

### **Domain A**

As in past sessions, the marks scored in Domain A were strong, indicating some excellent teaching of the processes stated in the specification.

### **Domain B**

Some excellent experimental work was carried out, along with some very thorough survey and questionnaire work. Interviews tended to be well analysed by some, although others presented the interviews as they happened, and made very little commentary about them. Secondary data, such as newspaper articles, were well used by most candidates.

### **Domain C**

This continues to be the weakest area for most candidates. The main problem was a lack of thorough consideration of possible choices with an evaluation of the consequences of each. Where this had been done a plan of action could be formulated, with a consideration of its impact.

This is a very important part of the coursework component. Many candidates would have benefitted from more thorough teaching of this aspect of the coursework before they embarked on their investigations. This would undoubtedly have increased their focus.

The candidates who scored the lowest marks in Domain C were those who made a poor choice of topic.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/41

Paper 41

## Key Messages

Make effective use of the source materials – these provide the context for the questions in this paper. Make sure that in each question you are using the information given.

Ensure that you understand how to apply the range of mathematical and graphic techniques evident in past examples of examination papers for this syllabus.

## General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Borneo. Many candidates understood and made good use of the source material. Written responses were sufficiently clearly expressed to give the examiners confidence 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 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) Most candidates gave credible consequences of improving educational standards, gaining credit.
- (ii) The advantages of preventing illegal logging proved to be rather harder for candidates to identify clearly. Credit-worthy responses such as the loss of revenue to the government when illegal logging takes place were only suggested by some candidates.
- (b) (i) The majority of candidates chose plan B. To gain maximum credit this needed to be supported by reasons based on the source information rather than simply suggesting that this plan was more accurate or reliable.
- (ii) Most candidates made credit-worthy suggestions and gained appropriate credit.
- (iii) Most candidates correctly suggested that along-alang absorbed a great deal of water so the seeds of other plants could not germinate.
- (c) (i) Most candidates made the point that yields would be greater with high density planting, earning partial credit. Some of these candidates were able to go on and make a second credit-worthy suggestion.
- (ii) The candidates readily identified at least one reason why processing palm oil into biofuel could be sustainable activity although very few candidates discussed the idea of biofuel being carbon neutral. Suggesting a reason why the activity might not be sustainable proved to be more demanding with loss of soil fertility being the most frequently seen answer that gained credit.

- (iii) and (iv) The term biodiversity was well understood by most candidates as were the advantages of maintaining biodiversity, so many candidates gained full credit.
- (d) The graph was usually correctly plotted and labelled gaining full credit. The most common error was to place years on the y axis, limiting the candidate to partial credit.
- (ii) The harvest estimates from the graph were nearly always correct so almost all candidates gained credit.
- (iii) Candidates needed to express the idea that the cost of increased fertiliser needs to be less than the increase in price of palm oil. Many candidates made this point and gained credit but there were some answers that implied that the cost of fertiliser would always be worthwhile which did not gain credit.
- (iv) The table was nearly always correctly completed so most candidates gained full credit.
- (v) The calculation of percentage increase in average weight proved demanding, but some candidates gained credit. The difference in average weight must be expressed as a percentage of the original weight.
- (vi) Most candidates identified a good advantages of heavier bunches of fruit, gaining credit.
- (e) The benefits of agro-forestry were explained well from the point of view of the farmer, so that candidates gained credit. However from the point of the environment the answers given were frequently too vague to gain credit. There was a tendency to quote some source information without any further qualification which does not gain credit. Some candidates gained full credit on this question, but the majority gained only partial credit.

## Question 2

- (a) (i) Most candidates suggested some reasons for increased flooding events. However, full credit was only awarded to a minority of candidates. These candidates correctly described a sequence of events leading to flooding.
- (ii) The destruction of infrastructure, or the long time needed to repair it, was appreciated by some candidates, earning credit. Other candidates suggested soil erosion, also earning credit.
- (iii) Some candidates appreciated that opencast mining creates coal dust which leads to breathing problems and lung infections, earning the credit. There were many suggestions that there would be an increase in malaria, this of course does not give rise to lung infections and did not gain credit.
- (iv) The comparisons were usually clearly given as stated in the mark scheme, thus earning credit.
- (b) (i) Most candidates gave at least one way in which the surveys should be carried out in the same way to allow a fair comparison between 2009 and 2012, thus earning partial credit.
- (ii) Knowledge of the role of mosquitoes in spreading malaria was seen in nearly all answers, allowing candidates to earn credit.

## Question 3

- (a) (i) The calculation of the cost per tonne was usually correctly completed so most candidates gained credit.
- (ii) Most candidates gained credit by selecting the appropriate information from the graph and showing that it was profitable to mine in December 2005.
- (iii) Nearly all the candidates gained credit as they identified by inspection of the graph when the mine was most profitable.



- (b) (i)** Many candidates described environmental damage in general terms and gained little or no credit. The question clearly asks for examples shown in the sketch. Some candidates did carefully look at the sketch, as asked, and identify specific changes, earning full credit.
- (ii)** Most candidates gave an opinion as to whether the environmental damage was long lasting or not, but it was not for the opinion that the credit was given. Some candidates did back up their answers with specific information from the sketches, earning partial credit for one piece of evidence, and needing to give two pieces of evidence to earn full credit. The source information was underused by most candidates.
- (iii)** Nearly all the candidates suggested simple survey methods without any real detail, earning partial credit if they gave one practical detail. The examiners were looking for any sensible method that related to the sketches. Some candidates did give two valid details and earned full credit, between them covering all the points in the mark scheme.
- (c) (i)** There were many good attempts to justify the proposed mine, earning much of the credit available. The examiners were pleased to see evidence of thoughtful evaluation of each mine. The best answers gained full credit.
- (ii)** Most candidates gave good reasons for protecting the national park, gaining partial or full credit. Some candidates gave correct general answers which were given credit. Other candidates made similar points, but made them specific to the situation in Kalimantan and were also given credit.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/42

Paper 42

## Key Messages

The source materials provide the context for the questions in this paper. Ensure that you are effectively using the information given in every question.

Make sure that you know how to use the range of graphical and mathematical techniques seen in past examination papers set for this syllabus.

## General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Australia. 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 some candidates.

Candidates had no problems completing the paper in the time available.

Overall the pattern of this paper is 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) Most candidates correctly calculated 20%, earning the credit available.
- (ii) Most candidates gave credible suggestions concerning the advantages of a large coalfield to the state of Queensland and Australia, gaining full credit.
- (b) (i) This question required the candidate to inspect the data given carefully and to give the one correct answer. Most candidates did this, but a surprisingly large number of careless mistakes and errors occurred, so that candidates lost credit.
- (ii) Again, this was correctly done by most candidates, but the expected answer was not stated as frequently as expected, both by candidates giving the incorrect month, but also, more puzzlingly, some candidates who gave answers which appeared unrelated to the question asked.
- (iii) The table presented gave four sets of weather data, only one set representing the weather leading to the worst flooding for 100 years. Some candidates clearly inspected the data and made a correct selection, earning credit. In other cases the first row was selected apparently without regard to the data given.
- (iv) The consequences of flooding on mining were well described by most candidates, earning credit. There were a few inappropriate descriptions of soil erosion which did not gain credit.
- (c) (i) Some candidates have clearly had practice in designing and carrying out such questionnaires and therefore made good suggestions and earned credit so that all the marking points were given by at least some candidates.. However, most candidates did not make sensible suggestions as to how to carry out a survey using a questionnaire. For example, it is usual to ask a sample of people

(which was credited) and not to ask all of the people locally (which is likely to be a very large number, and was not credited).

- (ii) Some candidates noted that the data in the table was in percentages and gave precise and detailed instructions how to calculate the percentages, gaining full credit. Many candidates suggested finding the average for each questionnaire answer, suggesting that they had not looked back to see what form the data should be in.
  - (iii) Most candidates gave credible answers to explain why so many people wanted the new coalfield to be developed. The need for employment being a greater concern than for the environment was the most commonly cited reason.
- (d) (i) The sequence of events leading to salinisation was correctly selected by the majority of candidates. In some cases the order of events was only partially correct, gaining only partial credit, but very few candidates failed to gain at least some credit.
- (ii) There were a wide range of suggestions to explain why the plants die in salty conditions. Some candidates correctly explained the principle of osmosis drawing water out of the roots towards the salty solution, earning credit. Many candidates gave incorrect suggestions about a failure to absorb nutrients.
- (e) (i) Nearly all the graphs were clearly plotted and the examiners were pleased to see that both axes were fully labelled by the majority of candidates so that most candidates gained full credit.
- (ii) From the candidate's own graph, the estimation of the yield of crop for the following year was usually 8.7 and nearly all answers were within the accepted range so that almost all candidates gained credit.
  - (iii) The economic need for careful use of fertilisers was clearly understood by candidates, so that most gained credit. A few candidates found it difficult to express their ideas sufficiently clearly to gain credit.
  - (iv) The events following nitrate and phosphate enrichment of water were well known by most candidates. All the points on the marks scheme were described by candidates many of whom gained most or all of the credit available. The only confusion that appeared was that, incorrectly, plants die from lack of oxygen rather than, correctly, lack of light, which lost some candidates credit. Only a few candidates recognised that bacteria are responsible for the decomposition (and therefore the deoxygenation).

## Question 2

- (a) (i) Most candidates understood the meaning of biodiversity. The number or variety of different species was required to gain credit rather than the number of different animal or plants and animals.
- (ii) Candidates were asked to describe a method for carrying out a fish survey. All the points on the mark scheme were given in some answers. A surprisingly small proportion of candidates gained credit by suggesting measurement of the mass, length and sexual maturity in a repeatable manner. More candidates just gave vague suggestions like 'count them' that could be given little or no credit.
  - (iii) There were a wide range of credible suggestions as to the advantages the no fish zone to Queensland and Australia, earning many candidates credit. The object of this conservation measure was not to start exporting fish as a few candidates suggested, earning no credit.
  - (iv) Many candidates realised that the details of fishing net construction were important and gained much or all of the credit, showing that they know this topic well. However a statement that large nets should be used did not make sense in context and could not gain credit. The examiners cannot assume that 'large nets' - which has a very clear incorrect meaning - actually means that the nets should have large holes. Similarly, statements about small nets without further detail could not be given credit. Most candidates got the credit for the restriction, but in some cases the reason for the restriction was not very clearly described.

- (b)** This question proved to be more demanding than expected suggesting that many candidates did not read the passage before the question, which contained the key piece of information that sea water may get too hot. Some candidates referred to burning fossil fuels leading to increased carbon dioxide levels and the greenhouse effect or global warming, earning credit. Other candidates incorrectly suggested a very wide range of possible causes for warming the oceans which was surprising given current global interest in global warming.
- (ii)** Candidates were equally divided between credible answers along the lines indicated in the mark scheme gaining them credit. There were other vague answers about 'accuracy' that could not gain credit without further qualification.
- (iii)** The question described an example of mutualism or symbiosis. Some candidates used these terms and gained credit. Other candidates gave clear descriptions of how each organism benefits from the association which also gained credit. However, some candidates just repeated the information given without any further detail or discussion which could not gain credit.
- (c) (i) and (ii)** The changes in food chain were well understood by nearly all candidates, most gaining full credit.

### Question 3

- (a) (i)** Nearly all the candidates used the information about cane toads and their prey to give sensible reasons why the cane toads failed to control the beetle, earning at least partial credit. Only some of the candidates gave a third possible reason, gaining full credit. Almost all candidates at least tried to answer the question.
- (ii)** The table was completed successfully by most candidates.
- (iii)** The average was correctly calculated by most candidates.
- (b) (i)** The examiners were pleased to see that most candidates drew neat tables with correct headings, earning at least partial credit. To gain full credit, candidates were expected to convert and present the tallies correctly and accurately. A small number of candidates did not make use of the information provided to arrive at the correct numbers for their table.
- (ii)** Some candidates used the information given to explain, in their own words, why the cane toad has become a serious pest in Queensland. There were some very thoughtful answers gaining all or most of the credit. All the points in the mark scheme were suggested in at least some answers. Many candidates, however, just repeated the source information without any further explanation. The examiners do expect to see information extracted from the source but candidates are expected to add some of their own thoughts and express these thoughts and factual material from the source, in their own words, in order to gain credit.

# ENVIRONMENTAL MANAGEMENT

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Paper 0680/43

Paper 43

## Key messages

Longer answers usually need to be supported by elaboration; longer answers may also require examples; always be guided by the number of marks as to the amount of detail needed.

Read each question more than once; underline key question words, especially the command words, the words that tell candidates what to do.

Make sure that all parts of the question are covered in the answer.

Do not begin by repeating the question. Sometimes this filled the first two lines of the answer. Begin the answer straight away. This makes it more likely that a full answer to the question has been given by the time all the lines for answering have been filled.

## General comments

**Question 1** and **Question 2** were, as usual, overall, of similar difficulty to candidates - in this paper, question 2 was very slightly easier.

Question instructions most frequently ignored in this examination were: **1(a)(iii)** 'Describe what the graph shows' - instead reasons were given for the importance of oil; and **2(a)(ii)** 'Describe how the percentage distribution of urban population' - instead the growth of urban population was described.

Questions in this examination which suffered most from limited coverage were: **2(b)** - high rates of natural increase or large scale rural to urban migration were omitted; and **2(c)(ii)** - advantages or disadvantages were not referred to.

Candidates were most comfortable with all the questions in **1(c)** (pages 4 and 5), and in **2(d)–(f)** (pages 12 to 15). Parts of **1(e)** and **(f)** proved to be more challenging.

Candidates gained most credit if they: attempted all the questions; gave as much attention to the last question as to the first; kept a careful eye throughout on question wording and the number of marks; attempted to elaborate upon and explain their basic answers to questions; made frequent references to appropriate examples.

## Comments on specific questions

### **Question 1**

Many candidates correctly gave the total world energy demand in **(a)(i)**. Other candidates' careless reading of the question led to some candidates incorrectly giving the total value for oil in 2010 for which they received no credit.

In **(a)(ii)** Many candidates gave the correct answer with very few incorrect answers.

There were some really good answers to part **(a)(iii)** from candidates who focused both on describing from the graph, and on the question theme of the importance of oil. Not only did such candidates realise that oil was the most used individual energy source at all three dates, but they also recognised that its relative importance within the total was declining as use of other sources increased. Sometimes such candidates used ratios or percentages in support as a way of relating amount of oil used to total world energy demand.

Less credit was given to other candidates who concentrated on the increased use of oil and used values from the graph in support. Most candidates gave the bare minimum graph description and relied too heavily on vague statements unsupported by graph evidence, gaining only partial credit. A few candidates referred to total energy demand rather than oil, which usually resulted in no credit being awarded.

Full credit was given in **(b)(i)** for some candidates who referred to petrol and diesel as the basis for most modern forms of land and sea transport, followed by one of its many advantages for transport over other energy sources, such as its cheapness, ease of use as a liquid, or the fact that modern forms of transport have been developed to run on oil based fuels. Many candidates concentrated instead on the great increase in transport worldwide and did not cover the main material of the question gaining, at best, partial credit.

Most candidates gained credit in **(b)(ii)** by establishing that more alternatives were available that were suitable for generating electricity. Some of these answers were continued by giving advantages of using alternatives such as lower levels of air pollution gaining full credit. The importance of coal in generating electricity in many countries was widely known by candidates.

Many candidates gained full credit in **(c)(i) – (c)(iii)**. Some candidates incorrectly labelled ‘hole in the ozone layer’ instead of global warming in part **(i)**, gaining no credit.

In **(c)(iv)**, most candidates understood what the question wanted and gained most or all of the credit by explaining in the same order as in the question, namely local, then international, and finally global effects. Other candidates took a less organized approach and gained less credit.

In **(c)(v)** virtually all candidates, in their own words, emphasised how greatly traffic emissions can be reduced by using buses instead of cars and recognised that the government of Dubai wanted people to give up their cars and travel by public transport.

‘Another way’, other than public transport, was needed in part **(c)(vi)**. The most popular choice was catalytic converters on vehicle exhausts; there was a good level of knowledge about how these worked to reduce dangerous emission giving many candidates full credit. Use of cleaner fuels such as compressed natural gas (CNG) was another popular choice through which some candidates gained full credit. Some other candidates referred to traffic management schemes, such as restrictions on city car entry or car use.

A good choice of city or country in **(d)(i)**, allowed specific and detailed answers to **(d)(ii)**. Many such candidates were able to gain full credit by giving precise reasons, including both physical and human, for the notoriously high levels of air pollution in the selected city. The choice of Los Angeles, for example, led many candidates for gain all or most of the credit as candidates referred to high levels of car ownership, dry climate dominated by high pressure and regular temperature inversions, and lowland relief surrounded by mountains. The choice of China, or a major city within the candidate’s own country permitted other candidates to gain most of the available credit. In such answers, the details given clearly matched the choice of city, but a common omission was lack of a reference to a physical factor favouring air pollution. Answers with limited coverage, or with a mis-match between reasons given and the choice of city or country were worth less credit.

In **(e)(i)** many candidates made it clear, either from a statement or from values quoted from the graph, that they knew that oil, coal and natural gas were the three fossil fuels. For such candidates, all relevant statements could then be credited. Many of these candidates did in fact make productive use of the graph of world energy demand, for example, giving percentage contributions to the total from fossil fuels which showed a progressive decline from 1990 to 2030. Some candidates were unable to identify the fossil fuels and gained no credit. Some answers were about all the energy sources in the table, others were about oil only. A few included references to only two of the three fossil fuels and could gain only partial credit.

In **(e)(ii)** candidates gained credit for drawing a line at 75 from top to bottom in the graph. Shorter vertical lines at 75 were also given credit. Some candidates gained no credit either by leaving the graph blank or by giving incorrect or ambiguous marks on the graph.

Question **(e)(iii)** proved, as anticipated, demanding for many candidates. Full credit was gained by candidates who understood the idea, referring to factors such as location, ease of access, costs of labour and materials, and technology and its availability. Some of the answers about wind power were, incorrectly, more about day to day variations in wind availability rather than variable long-term suitability of locations for high and regular wind speeds. Many answers based on nuclear power were about local raw material supplies, which only form a very small proportion of the total costs of nuclear power generation.

Some of the answers to **(e)(iv)** were given without any references to the graph during the discussion of possibilities for more wind and nuclear use. These answers were given partial credit because the question asked for use of knowledge as well as the graph. Some candidates showed that they understood that from the graph, only onshore wind could be competitive with oil at a world price of \$75 per barrel. Such candidates were in a strong position to answer the question, whatever their view about how likely it was that new wind and nuclear power stations would be built and such answers gained most or all of the available credit. A view expressed as 'unlikely' led to answers dominated by economic reasoning. A view expressed as 'likely' tended to be based on other factors, such as less polluting and longer lasting.

Most candidates gained credit in **(f)(i)**.

In **(f)(ii)** candidates who stated first the assessments which meant that it could not be wind (such as being weather dependent) and oil (such as emissions of carbon dioxide) gained credit. The candidates who then added to the information already given to explain why it was nuclear power (such as not fully sustainable because uranium is needed or not safe because of radiation) gained more credit up to the maximum available. Candidates, who re-stated without explanation or elaboration, the terms given in the Energy assessment table, gained little or no credit.

## Question 2

Most candidates gained credit in **(a)(i)** with an answer of 1990-2010. Those who did not gain credit typically stated only one of the dates (1990 or 2010) rather than the 20 year period asked for.

There were many clear, precise answers to **(a)(ii)** supported by the use of key percentages gaining much credit. Some candidates made it clear that the higher percentage of urban population that had existed in developed countries in 1950 had been replaced by a much higher percentage concentration in developing countries in 2010, gaining full credit. Other candidates lost credit by never actually mentioning the term 'urban' when referring to the population. Reasons for the changes gained no credit as they were irrelevant because the question asks for a description rather than an explanation.

Plotting the world population totals correctly for the three dates in part **(iii)** earned credit for almost all candidates. Most candidates gained credit for plotting the urban populations although some made errors and so did not gain full credit.

Partial credit for answers 'urban growth' were more common than full credit answers 'increased percentage of the population living in urban areas' in part **(a)(iv)**, even though candidates had just plotted these percentages on the graph. Once again there were quite a number of answers in which 'urban' was never mentioned, reducing the potential credit.

Candidates had plenty of choice of content for answering part **(b)**. Those candidates who included natural increase and migration, developing and developed in their answers had little trouble gaining full credit. Many candidates were familiar with reasons for high birth rates and rural to urban migration in developing countries. Some candidates made no reference to one of either natural increase or to rural to urban migration which limited credit. A few candidates misread the question and referred to push and pull factors for migration from developing to developed countries which limited credit. Others who correctly addressed both question themes referred only to what was happening in developing countries, ignoring differences with developed countries again limiting credit available.

For the mark in **(c)(i)** the letter **S** needed to be placed in one of the obviously empty spaces, on either side of the river, or on the slopes beyond the factories.

For a full explanation in **(c)(ii)** candidates needed to mention at least one advantage and one disadvantage. Some candidates referred to one without the other, limiting credit. Most of credit-worthy answers were explanations of the advantages and disadvantages of living near the river or near the factories. Stating 'near the factories' as an advantage needed to be qualified by its significance, for example in terms of nearness for finding a job, or low transport costs to reach work in order to gain credit.

In, **(d)(i)** and **(d)(ii)**, candidates were expected to select appropriate answers from the newspaper report, adding some additional comment towards the description of 'stable low-income neighbourhood' in **(ii)**. Most candidates gained all or most of the credit.

In **(d)(iii)** many candidates had few problems identifying and isolating two reasons for the big change, such as the Workers Party, supportive NGOs and local businesses, and police clearing out drug dealers. Some candidates gained little credit for continuing with the same answers as part **(ii)**.

In part **(e)(i)**, answers based on deforestation and high levels of pollution were most common. Differences in credit mainly reflected amount of elaboration, and degree of precision about the types of pollution and their effects. Many candidates concentrated on identifying three different types of environmental damage, with nothing more than a basic statement about each one, gaining only partial credit. Some candidates gave more context to their examples as well as content, gained more credit. References to pollution were only effective when the type of pollution was specified. Some candidates narrowly named only air, water and land pollution, mostly then giving answers that were short on real detail, thus limiting the amount of credit available.

Pleasingly, many candidates gained full credit in part **(e)(ii)** for expressing the idea that when a population increases, its carbon dioxide emissions can be expected to increase as well, the opposite of what has happened in Freiburg – however that understanding is expressed. Some candidates did no more than state what the graph showed, for both population and carbon dioxide and these were given partial credit.

There were plentiful choices on the map for candidates to describe in **(f)(i)**. When describing such material, candidates need to go beyond stating the terms seen on the map and in the question, such as eco-friendly, renewable and sustainable, in order to gain credit. Most candidates had sufficient understanding to gain at least partial credit for each of their chosen characteristics. Full credit was given to candidates who described more fully, as demanded in the question.

A wide range of options for dealing with urban wastes were named and explained in **(f)(ii)**. Some candidates worked from the trigger on the sketch and referred to waste water treatment first. Others began with recycling. Many of those who referred to landfill went out of their way to describe how the operations could be made more sanitary. The range and amount of content were the main determinants for the amount of credit given. Some answers stopped short of what was needed for full credit. A few candidates referred to methods of waste disposal forgetting that they were supposed to reduce environmental impacts, limiting the credit available. Answers from such candidates were typically landfill based. Taking the rubbish well away from the eco-city to be dumped is not an environmentally friendly solution and could earn no credit.