ENVIRONMENTAL MANAGEMENT

Paper 8291/11
Paper 11

Key messages

- Candidates need to be aware of the equal balance between ***Section A*** and ***Section B*** of the paper and should plan their time and answers accordingly.
- In ***Section A***, candidates should note the number of marks available for each part question and write answers appropriately. This will give them an indication of the amount of content and detail expected.
- It is important that instructions are followed carefully. Candidates should make sure that they understand the difference in meaning of the command words, such as state, suggest, predict, justify, describe, explain, compare and evaluate.
- Candidates should avoid repeating the question in their answers to avoid wasting examination time.
- Candidates should show all working out in calculation questions as credit may be available for the correct calculation method even if the final answer is incorrect.

General comments

There was generally a weak response to all questions across the paper and performance was uneven across the two sections of the paper. Some candidates did not answer **Question 2** (soil) as well as they answered **Question 1** (climate). Topics which proved more challenging were the effects mountains have on climate, ocean currents, deforestation and soil deterioration and slope management.

Few answers showed a good understanding of terms and attention to detail with effective use of exemplar material.

The most successful responses included effective use of appropriate examples to illustrate key points, along with supporting details using appropriate terminology.

Comments on specific questions

Section A

Question 1

This question assessed knowledge and understanding of climate linked to the location of two cities and their climate data (Tokyo and Sydney).

(a) (i) Most candidates were able to access the data in **Fig. 1.1** to gain some credit for comparing the climate for Tokyo and Sydney in August. A number of candidates gave a more generalised answer for the annual trend rather than focusing on the month of August.

(ii) Some candidates were able to explain why the climate data indicates that Tokyo is in the Northern Hemisphere and acknowledged that Tokyo is above the equator. Very few candidates were able to explain that during July/August, the Northern Hemisphere is tilted towards the Sun or that the Sun is higher in the sky.

(iii) This question proved challenging for the majority of candidates. Responses tended to describe mountains as 'blocking' wind and/or rain rather than explain the effects mountains have on climate. Answers to this question could be improved by explaining air movement over mountains linked with high altitude and precipitation.

(iv) This question proved very challenging for the majority of candidates with very few gaining the credit available. Candidates tended to refer to air currents coming off the sea rather than ocean currents. Answers could be improved by referring to the direction of flow of the ocean currents, i.e. currents from the poles bring colder conditions/currents from the equator bring warmer conditions.

(b) (i) Most candidates were able to access **Fig. 1.2** and gain some credit for this question. The most common answer was reference to high rainfall in Bangladesh/towards mountains.

(ii) This question assessed the causes of a summer monsoon. Weaker responses referred to the winds bringing moisture from the ocean with little further development. Candidates could have improved their answer by discussing temperature differences and pressure differences between land and ocean, and how this affects wind direction.

(c) This question assessed knowledge and understanding of the challenges to humans caused by high precipitation (monsoons) and required the candidate to relate their answer to the data in **Table 1.1**. Weaker responses focused on the inconvenience of travel/getting to work during high levels of rain rather than the impact of a monsoon. The most common answer which gained credit was reference to flooding. Answers could be improved by referring to impact on agricultural production/rice harvests leading to famine, soil erosion and landslides, and contamination of water supply leading to water related diseases.

Question 2

This question assessed knowledge and understanding of soil formation, components of soil and slope management strategies. Candidates found this question more challenging than **Question 1**.

(a) (i) Most candidates were able to gain credit for reference to rocks breaking down into smaller pieces. Few answers referred to no chemical change involved or rocks not changing in composition.

(ii) Most candidates were able to gain credit for this question, with the most common response being reference to temperature. Generally, answers could be improved by considering the structure/texture of rock, fluctuation in temperature and availability of water.

(b) (i) Most candidates were successful in stating the correct answer of sandy clay loam.

(ii) This question assessed knowledge of composition of soil. Most candidates were able to provide one component of soil which was, most commonly, water or organic matter. A large number of responses incorrectly cited rock or named a type of soil, e.g. loam.

(c) (i) This question required candidates to describe the data shown in **Fig. 2.2** (distribution of change in forest area). It was generally well answered with the majority of candidates giving more than one creditworthy response.

(ii) Most candidates found this question challenging and did not link deforestation to soil deterioration. A large number of candidates' responses referred to the effects of deforestation in general, e.g. loss of habitats rather than the effect on soil. Where candidates gained credit, their answer explained that removal of roots caused the soil to be loose.

(iii) Weaker candidates generally continued their answer from **Question 2(c)(ii)** rather than stating two threats to soil other than deforestation. Candidates could have improved their answer by considering effects of agricultural machinery, salinization, land pollution, intensive agriculture and compaction.

(d) This question assessed knowledge and understanding of slope management strategies. Most candidates found this question challenging and tended to simply describe **Fig. 2.3** rather than describe how the strategies reduced the risk of mass movement. Responses could be improved by considering how the strategies improve soil stability, prevent water erosion, and prevent waterlogging and roots rotting.

Section B

Question 3 and **Question 4** were almost equally popular while **Question 5** was chosen by fewer candidates. Both **(a)** and **(b)** were tackled equally well with only a small number of candidates not completing both parts.

Question 3

(a) The majority of candidates tended to simply describe the diagram in **Fig. 3.1** rather than compare and contrast the impacts of the hazards associated with volcanic eruptions. Candidates could have improved their answers with better reference to the data in **Fig. 3.1**, i.e. comparing the impacts in respect to distance and timescale from the time of eruption.

(b) Successful answers needed to show a good understanding of the damage caused by both explosive and effusive volcanic eruptions and the factors that determine damage and loss of life, other than eruption style, using contrasting examples. Less successful answers showed a lack of knowledge of the two different eruption styles. Most candidates continued their response to **Question 3(a)**, referring to **Fig. 3.1** and an explosive eruption style with focus on planning for evacuation. More successful candidates considered the difference in the two styles of eruption alongside factors such as population density, topography and location with regard to rivers, mountains and oceans.

Question 4

(a) This question assessed knowledge and understanding of the impacts of global warming on different areas at risk around the globe. Most candidates were able to describe the general impact for each of the areas shown in **Fig. 4.1**. Less successful answers simply listed the data shown in **Fig. 4.1** with little development. Stronger responses were able to describe how global warming impacted on ice melting, circulation change and biome loss.

(b) This question assessed knowledge of the use of renewable resources to meet energy needs and the reduction of the impact of global warming. Candidates needed to refer to countries at contrasting levels of economic development. Less successful candidates tended to list renewable energy sources and their merits with vague references to countries of different levels of economic development, rather than considering why MEDCs can use renewable resources whereas LEDCs cannot. There was little/no reference in their answers to the reasons why MEDCs should take responsibility for renewable resources and LEDCs should develop their own renewable resources.

Generally, candidates could have improved their response by considering the idea that MEDCs may be responsible for the atmospheric pollution over their industrial history and have benefited economically, and that LEDCs are more reliant on non-renewable resources as well as the need for LEDCs to develop their own use of renewable resources.

Question 5

(a) This question assessed an understanding of the factors shown in **Fig. 5.1** that contributed to the reduction in CFC emissions. The majority of candidates referred to the Montreal Protocol and its success. Weaker candidates listed the factors in **Fig. 5.1** with little or no explanation.

(b) This question was not well answered as many candidates chose to focus on describing general sources of air pollution from cars/transport rather than discuss managing air pollution. Answers were often quite lengthy and gave some detail but without content that addressed the question.

Candidates could have improved their answers by considering why air pollution is a problem in urban areas with reference to population density and demand for services/transport, the strategies for managing air pollution and the difficulties in managing air pollution.

ENVIRONMENTAL MANAGEMENT

Paper 8291/12
Paper 12

Key messages

- Candidates need to be aware of the equal balance between ***Section A*** and ***Section B*** of the paper and should plan their time and answers appropriately.
- In ***Section A***, candidates should note the number of marks available for each part question and write answers accordingly. This will give them an indication of the amount of content and detail expected.
- It is important that instructions are followed carefully. Candidates should make sure that they understand the difference in meaning of the command words such as state, suggest, predict, justify, describe, explain, compare and evaluate.
- Candidates should avoid repeating the question in their answers to avoid wasting examination time.
- Candidates should show all working out in calculation questions as credit may be available for the correct calculation method even if the final answer is incorrect.

General comments

There was generally a good response to all questions across the paper, although in some cases performance was uneven across the two sections of the paper. Some candidates found **Question 1** (global warming) less demanding than **Question 2** (weather patterns and tropical cyclones). Topics which proved more challenging were the extraction of fossil fuels and anticyclones.

Many answers showed a good understanding of terms and attention to detail with effective use of exemplar material.

The most successful responses included effective use of appropriate examples to illustrate key points, along with supporting details using appropriate terminology.

Comments on specific questions

Section A

Question 1

This question assessed knowledge and understanding of global warming and renewable resources.

(a) (i) Most candidates were able to access the data in **Fig. 1.1** to gain credit for describing the trends in the variation in global temperatures compared to average global temperature.

(ii) This question assessed knowledge and understanding of how global atmospheric carbon dioxide levels result in global warming. Most candidates were able to identify carbon dioxide as a greenhouse gas. The most successful candidates were able to explain the enhanced greenhouse effect in detail.

(iii) This question proved challenging for some candidates. Candidates tended to describe the environmental impacts of fossil fuels in general and linked their answer to air pollution rather than described the impact of the extraction of fossil fuels. Answers to this question could be improved by considering exploration for new sites of fossil fuels and habitat loss, noise from mining and transportation along with instability in nearby slopes, and the impacts of fracking.

(b) (i) Most candidates were able to use the data in **Fig. 1.2** to correctly calculate the percentage of countries that reached their 2020 target for energy supplied from renewable resources by 2016 as either 39.3 or the correct working of ($^{11}/_{28}$) × 100.

(ii) The majority of candidates made one creditworthy point for describing what is meant by renewable resources as something that does not run out or is not finite. A very few answers gained the credit for including the idea of a renewable resource as a fuel or something that can produce heat.

(iii) Few candidates were able to suggest reasons for the variations in targets set for each country in **Fig. 1.2** to gain full credit. The most common answer was high population followed by different economic status.

(c) This question assessed knowledge and understanding of the challenges of the use of nuclear energy to generate electricity. References to cost were commonly seen but often the cost of the electricity produced by nuclear energy instead of the initial cost of building the plant. Answers could be improved by considering the high risk to health if accidents occur, challenges of storing waste and public opinion.

Question 2

This question assessed knowledge and understanding of weather features, weather forecast, anticyclones and tropical cyclones. Some candidates found this question more challenging than **Question 1**.

(a) (i) Most candidates gave the correct answer of 1024 (mb).

(ii) The identification of weather feature **X** as a depression or a low pressure system was an area candidates found particularly challenging.

(iii) This question assessed knowledge of methods used to forecast weather patterns. Most responses included measurements with instruments such as pressure and windspeed. Stronger responses included satellite data, visual and infra-red photography and use of computer modelling.

(iv) This question required candidates to describe weather conditions associated with an anticyclone. The majority of candidates found this question challenging and responses suggested that many did not understand the key term ‘anticyclone’.

(b) (i) Candidates were required to describe the impacts of a tropical cyclone on the area shown in **Fig. 2.2**. This question was generally well answered with the majority of candidates achieving credit.

(ii) Candidates were able to offer a range of strategies to manage the impact of a tropical cyclone on the area shown in **Fig. 2.2**. Weaker responses tended to repeat the answer given for **Question 2(b) (i)** or provide a list. More successful candidates gave developed answers to explain how the strategies chosen would reduce the impact of a tropical cyclone.

Section B

Question 3 and **Question 4** were almost equally popular while **Question 5** was chosen by fewer candidates. Both **(a)** and **(b)** were equally well attempted with only a small number of candidates not completing both parts.

Question 3

(a) The majority of candidates were able to use some data from **Fig. 3.1** to compare the environmental impact of an animal-based diet with that of a plant-based diet, particularly the area of land in hectares for each food. More successful candidates referred to the results of increased land use, such as habitat destruction, loss of biodiversity and deforestation.

(b) Successful answers needed to show a good understanding of the impact of urban sprawl, the strategies that can be used to manage urban sprawl, their limitations and use a range of examples. Most candidates were able to discuss a range of impacts of urban sprawl and the more successful responses considered strategies such as maintaining a balance of natural habitats and built environment, planning restrictions, use of a green belt and managing public transportation, with

reasoned arguments of the limitations of these strategies. Stronger candidates provided a balanced argument and included evaluative statements in their answer.

Question 4

(a) This question assessed knowledge and understanding of strategies used to reduce the impacts of a tsunami. Most candidates made good use of the diagram in **Fig. 4.1** with stronger candidates providing a balanced answer between the impacts of a tsunami and how the strategies shown may mitigate these effects. Weaker candidates tended to simply list the strategies shown.

(b) This question assessed knowledge of plate tectonics in relation to the impacts of volcanoes and earthquakes. Candidates were required to discuss how understanding of plate tectonics might reduce the impacts of volcanoes and earthquakes and the limitations of preparing for tectonic hazards. More successful responses provided a balance between discussion of types of plate boundaries, types of volcanic eruptions and where earthquakes might happen, with the limitations of this knowledge in predicting events and use of a range of examples.

Question 5

(a) This question assessed data handling skills with regards to comparing the extent to which different sources have reduced emissions of nitrogen oxides from 1990–2016. Most candidates were able to describe the general trends in the data in **Fig. 5.1** and identified the largest decrease in energy supply and transport. Less successful answers just quoted the data with little analysis or explanation. More successful answers referred to improved management in industrial/domestic emissions by use of scrubbers and clean fuels in household stoves, the use of catalysts in industry to convert nitrogen oxides to nitrogen and the introduction of catalytic converters now built into vehicles.

(b) This question was not well answered as many candidates did not address the question as it was set. They chose to focus on describing the effects of acid rain and general sources of air pollution from cars/transport rather than discussing international strategies to reduce acid rain and the challenges in working internationally. Answers were often quite lengthy and gave some detail but lacked content that addressed the question.

Candidates could have improved their answers by considering both international and local strategies in the context of the challenge that sulfur dioxide/nitrogen oxides can be produced in a particular location and then the acidic particles can be transported in air currents far away from their source and deposited as acid rain. Stronger candidates provided a balanced answer with evaluative statements and a range of examples or case studies in support.

ENVIRONMENTAL MANAGEMENT

Paper 8291/13
Paper 13

Key messages

- Candidates need to be aware of the equal balance between ***Section A*** and ***Section B*** of the paper and should plan their time and answers accordingly.
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- Candidates should show all working out in calculation questions as credit may be available for the correct calculation method even if the final answer is incorrect.

General comments

There was generally a weak response to all questions across the paper and performance was uneven across the two sections of the paper. Some candidates did not answer **Question 2** (soil) as well as they answered **Question 1** (climate). Topics which proved more challenging were the effects mountains have on climate, ocean currents, deforestation and soil deterioration and slope management.

Few answers showed a good understanding of terms and attention to detail with effective use of exemplar material.

The most successful responses included effective use of appropriate examples to illustrate key points, along with supporting details using appropriate terminology.

Comments on specific questions

Section A

Question 1

This question assessed knowledge and understanding of climate linked to the location of two cities and their climate data (Tokyo and Sydney).

(a) (i) Most candidates were able to access the data in **Fig. 1.1** to gain some credit for comparing the climate for Tokyo and Sydney in August. A number of candidates gave a more generalised answer for the annual trend rather than focusing on the month of August.

(ii) Some candidates were able to explain why the climate data indicates that Tokyo is in the Northern Hemisphere and acknowledged that Tokyo is above the equator. Very few candidates were able to explain that during July/August, the Northern Hemisphere is tilted towards the Sun or that the Sun is higher in the sky.

(iii) This question proved challenging for the majority of candidates. Responses tended to describe mountains as 'blocking' wind and/or rain rather than explain the effects mountains have on climate. Answers to this question could be improved by explaining air movement over mountains linked with high altitude and precipitation.

(iv) This question proved very challenging for the majority of candidates with very few gaining the credit available. Candidates tended to refer to air currents coming off the sea rather than ocean currents. Answers could be improved by referring to the direction of flow of the ocean currents, i.e. currents from the poles bring colder conditions/currents from the equator bring warmer conditions.

(b) (i) Most candidates were able to access **Fig. 1.2** and gain some credit for this question. The most common answer was reference to high rainfall in Bangladesh/towards mountains.

(ii) This question assessed the causes of a summer monsoon. Weaker responses referred to the winds bringing moisture from the ocean with little further development. Candidates could have improved their answer by discussing temperature differences and pressure differences between land and ocean, and how this affects wind direction.

(c) This question assessed knowledge and understanding of the challenges to humans caused by high precipitation (monsoons) and required the candidate to relate their answer to the data in **Table 1.1**. Weaker responses focused on the inconvenience of travel/getting to work during high levels of rain rather than the impact of a monsoon. The most common answer which gained credit was reference to flooding. Answers could be improved by referring to impact on agricultural production/rice harvests leading to famine, soil erosion and landslides, and contamination of water supply leading to water related diseases.

Question 2

This question assessed knowledge and understanding of soil formation, components of soil and slope management strategies. Candidates found this question more challenging than **Question 1**.

(a) (i) Most candidates were able to gain credit for reference to rocks breaking down into smaller pieces. Few answers referred to no chemical change involved or rocks not changing in composition.

(ii) Most candidates were able to gain credit for this question, with the most common response being reference to temperature. Generally, answers could be improved by considering the structure/texture of rock, fluctuation in temperature and availability of water.

(b) (i) Most candidates were successful in stating the correct answer of sandy clay loam.

(ii) This question assessed knowledge of composition of soil. Most candidates were able to provide one component of soil which was, most commonly, water or organic matter. A large number of responses incorrectly cited rock or named a type of soil, e.g. loam.

(c) (i) This question required candidates to describe the data shown in **Fig. 2.2** (distribution of change in forest area). It was generally well answered with the majority of candidates giving more than one creditworthy response.

(ii) Most candidates found this question challenging and did not link deforestation to soil deterioration. A large number of candidates' responses referred to the effects of deforestation in general, e.g. loss of habitats rather than the effect on soil. Where candidates gained credit, their answer explained that removal of roots caused the soil to be loose.

(iii) Weaker candidates generally continued their answer from **Question 2(c)(ii)** rather than stating two threats to soil other than deforestation. Candidates could have improved their answer by considering effects of agricultural machinery, salinization, land pollution, intensive agriculture and compaction.

(d) This question assessed knowledge and understanding of slope management strategies. Most candidates found this question challenging and tended to simply describe **Fig. 2.3** rather than describe how the strategies reduced the risk of mass movement. Responses could be improved by considering how the strategies improve soil stability, prevent water erosion, and prevent waterlogging and roots rotting.

Section B

Question 3 and **Question 4** were almost equally popular while **Question 5** was chosen by fewer candidates. Both **(a)** and **(b)** were tackled equally well with only a small number of candidates not completing both parts.

Question 3

(a) The majority of candidates tended to simply describe the diagram in **Fig. 3.1** rather than compare and contrast the impacts of the hazards associated with volcanic eruptions. Candidates could have improved their answers with better reference to the data in **Fig. 3.1**, i.e. comparing the impacts in respect to distance and timescale from the time of eruption.

(b) Successful answers needed to show a good understanding of the damage caused by both explosive and effusive volcanic eruptions and the factors that determine damage and loss of life, other than eruption style, using contrasting examples. Less successful answers showed a lack of knowledge of the two different eruption styles. Most candidates continued their response to **Question 3(a)**, referring to **Fig. 3.1** and an explosive eruption style with focus on planning for evacuation. More successful candidates considered the difference in the two styles of eruption alongside factors such as population density, topography and location with regard to rivers, mountains and oceans.

Question 4

(a) This question assessed knowledge and understanding of the impacts of global warming on different areas at risk around the globe. Most candidates were able to describe the general impact for each of the areas shown in **Fig. 4.1**. Less successful answers simply listed the data shown in **Fig. 4.1** with little development. Stronger responses were able to describe how global warming impacted on ice melting, circulation change and biome loss.

(b) This question assessed knowledge of the use of renewable resources to meet energy needs and the reduction of the impact of global warming. Candidates needed to refer to countries at contrasting levels of economic development. Less successful candidates tended to list renewable energy sources and their merits with vague references to countries of different levels of economic development, rather than considering why MEDCs can use renewable resources whereas LEDCs cannot. There was little/no reference in their answers to the reasons why MEDCs should take responsibility for renewable resources and LEDCs should develop their own renewable resources.

Generally, candidates could have improved their response by considering the idea that MEDCs may be responsible for the atmospheric pollution over their industrial history and have benefited economically, and that LEDCs are more reliant on non-renewable resources as well as the need for LEDCs to develop their own use of renewable resources.

Question 5

(a) This question assessed an understanding of the factors shown in **Fig. 5.1** that contributed to the reduction in CFC emissions. The majority of candidates referred to the Montreal Protocol and its success. Weaker candidates listed the factors in **Fig. 5.1** with little or no explanation.

(b) This question was not well answered as many candidates chose to focus on describing general sources of air pollution from cars/transport rather than discuss managing air pollution. Answers were often quite lengthy and gave some detail but without content that addressed the question.

Candidates could have improved their answers by considering why air pollution is a problem in urban areas with reference to population density and demand for services/transport, the strategies for managing air pollution and the difficulties in managing air pollution.

ENVIRONMENTAL MANAGEMENT

Paper 8291/21
Paper 21

Key messages

- Candidates need to be aware of the equal balance between ***Section A*** and ***Section B*** of the paper and should plan their time and answers accordingly.
- In ***Section A***, candidates should note the number of marks available for each part question and write answers accordingly. This will give them an indication of the amount of content and detail expected.
- It is important that instructions are followed carefully. Candidates should make sure that they understand the difference in meaning of the command words such as state, suggest, predict, justify, describe, explain, compare and evaluate.
- Candidates should avoid repeating the question in their answers to avoid wasting exam time.
- Candidates should show all working out in calculation questions as credit may be available for the correct calculation method even if the final answer is incorrect.

General comments

There was generally a weak response to all questions in the paper and performance was uneven across the two sections of the paper. Some candidates did not answer **Question 2** (succession and farming) as well as they answered **Question 1** (food webs and net primary productivity). Topics which proved more challenging were net primary productivity, succession and comparison of subsistence and commercial farming.

Few answers showed a good understanding of terms and attention to detail with effective use of exemplar material.

The most successful answers included effective use of appropriate examples to illustrate key points, along with supporting details using appropriate terminology.

Comments on specific questions

Section A

Question 1

This question assessed knowledge and understanding of the effects of marine debris on marine wildlife, food webs and net primary productivity.

(a) (i) Most candidates were able to access the data in **Table 1.1** to give the correct answer of fish.

(ii) Most candidates were able to give the correct answer of birds.

(iii) References to debris coming from fishing or boats was the most common correct answer. A significant number of candidates simply listed types of debris from **Table 1.1** rather than suggesting sources of debris.

(iv) Most candidates were able to use the data in **Table 1.1** to correctly calculate the percentage of all mammals affected by plastic bags as 26%.

(b) (i) Some candidates gained credit for stating correctly that the arrows in the food web in **Fig. 1.1** showed the transfer of energy. Weaker candidates stated that the arrows showed what each species ate.

(ii) This question was generally well answered and assessed knowledge and understanding of food webs. Most candidates were able to gain the majority of the credit available for correctly describing the effect on the food web of the reduction in sea turtle numbers.

(iii) This question was reasonably well answered with most candidates gaining credit. The two most common suggestions were to improve recycling or re-use of plastic bags and to change to paper bags. More successful candidates also considered legislation to reduce single-use bags and developed their answers to suggest why the strategy they had chosen would be effective.

(c) (i) The majority of candidates were able to correctly complete the bar chart in **Fig. 1.2**.

(ii) This question proved challenging for most candidates with very few being able to refer to the lack of sunlight penetrating into the ocean and therefore no photosynthesis. Candidates appeared not to understand the key term of net primary productivity.

(iii) This question proved challenging with very few candidates accessing all of the credit available. Some responses linked the high concentration of nutrients to the use of fertilisers or the river picking up nutrients as it flowed from land to sea. Some candidates did not answer this question.

Question 2

This question assessed knowledge and understanding of succession, abiotic and biotic factors, and subsistence and commercial farming. Some candidates found this question more challenging than **Question 1**.

(a) (i) Very few candidates were able to state the process shown in **Fig. 2.1** as succession.

(ii) This question required the candidates to explain the process of succession using **Fig. 2.1** and proved to be challenging for most. Weaker responses simply described the diagram, mentioning sediments and grasses/shrubs growing. Stronger answers linked sedimentation and evaporation with a build up of nutrients and increase in soil fertility leading to plants colonising the swampy area.

(iii) Some candidates confused abiotic and biotic factors with biotic factors less likely to be correct. Most candidates accessed some of the credit for this question.

(b) (i) Candidates were required to use their knowledge and understanding of commercial farming and link this to loss of local habitats, using the data in **Table 2.1**. Most were able to access credit. The most common response related to use of chemical fertilisers, pesticides and herbicides and the damage they cause.

(ii) Most candidates were successful with loss of food or shelter and disruption to the food web as the most common responses. Very few candidates used the key term ‘monoculture’ in relation to planting crops as a reason for a reduction in biodiversity. Weak answers simply referred to loss of habitat.

(iii) Most candidates did well in this question with the most common responses of education and legislation.

Section B

Question 3 and **Question 5** were almost equally popular while **Question 4** was chosen by fewer candidates. Both **(a)** and **(b)** were equally well attempted with only a small number of candidates not completing both parts.

Question 3

(a) Most candidates were able to explain the advantages and disadvantages of animal breeding programmes and release into National Parks using **Fig. 3.1**. Stronger candidates were able to offer

some balance of advantages and disadvantages in their response. Weaker answers tended to focus more on the disadvantages, copying information from **Fig. 3.1** with only one or two advantages in comparison.

(b) This question assessed knowledge of conservation methods other than animal breeding programmes and release into National Parks. Stronger candidates were able to use a range of examples such as local conservation areas, ecological islands and ecotourism, and critically assess the relative success of each. Weaker candidates tended to list a range of strategies with little development and evaluation.

Question 4

(a) This question proved challenging for some candidates, with responses mainly a description of the trend in the changes in Arctic sea ice extent shown in **Fig. 4.1** with little or no explanation other than global warming. Stronger answers made good use of **Fig. 4.1** and offered a balanced approach.

(b) This question assessed knowledge of a range of international protocols and understanding of the difficulty in achieving and monitoring the protocols. The most successful answers demonstrated good knowledge of international protocols, the Montreal Protocol, Kyoto and the Paris Agreement being the most common, and offered good balance with evaluation of the success and the challenges of the protocols. Some responses were very generalised with no reference to international protocols. Weaker candidates did not show understanding of what protocol meant, and their answers focused on use of fossil fuels in some detail, without addressing the question as set.

Question 5

(a) This question assessed data handling skills with regards to human population from 1800 with a prediction to 2100. Most candidates were able to describe the general trends in the data in **Fig. 5.1** and identified the largest increase in population after 1940. Less successful answers quoted the data with little analysis or explanation. More successful responses provided an explanation of the rapid growth in population as a result of better diets, hygiene and health care leading to a reduced death rate and increased birth rate. They also included reasons for the predicted levelling off and decline from 2040 onwards.

(b) This question was not well answered as many candidates did not answer the question as it was set. Responses focused on describing the effects of an increase in population, such as more cars and therefore more air pollution, rather than the impact on resources and the approaches to provision and preservation of resources. Answers were often quite lengthy and gave some detail but lacked content that addressed the question.

Candidates could have improved their answers by considering infrastructure, political will and population stability and comparing these approaches in countries with different levels of economic development. Stronger candidates provided a balanced answer with evaluative statements and a range of examples or case studies in support.

ENVIRONMENTAL MANAGEMENT

Paper 8291/22
Paper 22

Key messages

- Candidates need to be aware of the equal balance between ***Section A*** and ***Section B*** of the paper and should plan their time and answers accordingly.
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- It is important that instructions are followed carefully. Candidates should make sure that they understand the difference in meaning of the command words such as state, suggest, predict, justify, describe, explain, compare and evaluate.
- Candidates should avoid repeating the question in their answers to avoid wasting examination time.
- Candidates should show all working out in calculation questions as credit may be available for the correct calculation method even if the final answer is incorrect.

General comments

There was generally a good response to all questions across the paper, although in some cases performance was uneven across the two sections of the paper. Some candidates found **Question 1** (water stress) less demanding than **Question 2** (rainforests, their climate and soil quality). Topics which proved more challenging were productivity and impact of soil quality on vegetation.

Many answers showed a good understanding of terms and attention to detail with effective use of exemplar material.

The most successful answers included effective use of appropriate examples to illustrate key points, along with supporting details using appropriate terminology.

Comments on specific questions

Section A

Question 1

This question assessed knowledge and understanding of the impact of large amounts of water needed for cotton growing on water stores and flows, water stress and the negative aspects of pesticide use.

(a) (i) Most candidates were able to use the data in **Fig. 1.1** to correctly calculate the volume of water used to make jeans for a class of 30 students as 240 000.

(ii) Most candidates were able to use the data in **Fig. 1.1** to correctly calculate the number of people for which the stated volume of water would provide drinking water for one year as 75. Credit was awarded for the correct working in cases where the final answer was incorrect.

(iii) This question was challenging for some candidates. Successful answers linked the idea of large scale use of water for cotton growing with depletion of ground water stores leading to salt water intrusion or salination, and land subsidence.

(b) (i) This question required candidates to discuss the data shown in **Fig. 1.2** which shows the level of water stress in the top ten cotton producing countries. Most candidates were able to access credit

with a response that stated Brazil has the lowest water stress and Uzbekistan has extremely high water stress. Few candidates made the link that cotton production is not the main cause of water stress.

(ii) Most candidates were able to calculate the water stress for China in 2019 correctly as 21.06.

(c) (i) Most candidates were able to estimate the percentage loss in area for the Aral Sea between 1960 and 1989 from **Fig. 1.3** correctly, with an answer between 20 and 35%.

(ii) There was a mixed response to this question, which proved challenging for some candidates. Weaker responses suggested incorrectly that the main impact of loss of the Aral Sea on people living at location **X** was lack of drinking water. The most common answer was loss of the fishing industry or loss of fish as food.

(iii) This question was generally well answered with the majority of candidates gaining credit. The most successful answers included references to displacement of people, noise and visual pollution as well as loss of habitats and flooding of some areas.

(d) Candidates accessed credit through the idea that insects, particularly beneficial insects such as bees, would be affected. Weaker candidates just referred to loss of insects or other animals rather than how the pesticides might accumulate in the food chain. In good answers, there was an awareness of the pollution risk to water stores. Stronger candidates demonstrated knowledge of both biomagnification and bioaccumulation.

Question 2

This question assessed knowledge and understanding of the Madagascan Rainforest particularly in relation to climate, loss of rainforest and decrease in soil quality. Some candidates found this question more challenging than **Question 1**.

(a) (i) Most candidates were able to state the temperature range for March in Madagascar correctly as between 7 and 9 degrees.

(ii) Most candidates were able to state the precipitation for February in Madagascar shown in **Fig. 2.1** correctly as between 310 and 320 mm.

(iii) This question was accessible to all candidates, with the majority able to use **Fig. 2.1** to describe the changes in the area of rainforest to gain credit. Most candidates identified that large areas of rainforest were lost and that most was lost from the East along coastal areas.

(iv) There was a mixed response to this question. Weaker responses focused on deforestation for the urban areas, the roads and the airport. More successful responses considered subsistence farming, logging for timber and the effects of global warming such as forest fires.

(v) This question proved challenging for most candidates with very few being able to refer to primary productivity and rate of photosynthesis. Most candidates accessed credit for reference to fertile or nutrient rich soil.

(b) This question was challenging for some candidates. Successful answers linked loss of nutrients to poor plant growth and loss of structure of soil to roots having less structure to hold to. Some candidates did not answer this question.

(c) Most candidates accessed credit with education and legislation/fines for deforestation as the most common responses for strategies to sustainably manage rainforests in LEDCs. More successful candidates also considered licensing to control logging or mining and support for farmers to fertilise existing land.

Section B

Question 3 and **Question 4** were almost equally popular while **Question 5** was chosen by fewer candidates. Both **(a)** and **(b)** were equally well attempted with only a small number of candidates not completing both parts.

Question 3

(a) Most candidates were able to explain the advantages and disadvantages of ecotourism as a method of conservation using **Fig. 3.1**. Stronger candidates were able to offer some balance of advantages and disadvantages in their answers. Weaker responses tended to focus more on the advantages, repeating information from **Fig. 3.1** with only one or two disadvantages in comparison.

(b) This question assessed knowledge of National Parks as a method of conservation. Stronger candidates were able to describe a range of conservation strategies used in National Parks with named examples, describe the pressures on a National Park from increasing urbanisation and industrial pressures as well as providing a balanced assessment of the relative success of the different strategies described.

Question 4

(a) This question assessed data handling skills with regards to sea level change using estimates from the past, actual records and predictions for the future shown in **Fig. 4.1**. Most candidates were able to describe the trends in **Fig. 4.1** but were not able to explain the data trends. The question required explanation of the data trends in terms of estimates of the past which are generalised and based on very little evidence, actual records which are more accurate and based on scientific records gathered, and predictions which are based on educated calculations. Most candidates discussed the causes of changes in sea level such as polar ice caps melting which did not answer the question.

(b) This question assessed knowledge of a range of international protocols and understanding of the extent to which they are successful in managing the causes of sea level change. The strongest answers demonstrated good knowledge of international protocols, the Montreal Protocol, Kyoto and the Paris Agreement being the most common, and offered good balance with evaluation of the success and the challenges of the protocols. Some responses were very generalised with no reference to international protocols. Weaker candidates tended to focus their answer on the causes of sea level changes.

Question 5

(a) This question assessed data handling skills with regards to predicted percentage change in human population by continent from 2019 to 2100. Most candidates were able to describe the general trends in the data in **Fig. 5.1** and identified the highest predicted increase as Africa followed by Oceania and then North America. Less successful answers quoted the data with little analysis or explanation. Stronger responses provided an explanation for the predicted fall in Europe in comparison to the huge predicted increase in Africa. Some candidates referred to the one child policy in China even though this has now been abandoned.

(b) This question was not well answered as many candidates did not answer the question as it was set. Responses focused on urbanisation, the need for housing, increased use of cars or transport as well as lack of money for food rather than improving agricultural practices to increase food production. Answers were often quite lengthy and had some detail but without content that addressed the question. Stronger candidates provided a balanced answer considering both intensive and subsistence level farming techniques with evaluative statements and a range of examples or case studies in support, as well as the problems faced by countries at different levels of economic development.

ENVIRONMENTAL MANAGEMENT

Paper 8291/23
Paper 23

Key messages

- Candidates need to be aware of the equal balance between ***Section A*** and ***Section B*** of the paper and should plan their time and answers accordingly.
- In ***Section A***, candidates should note the number of marks available for each part question and write answers accordingly. This will give them an indication of the amount of content and detail expected.
- It is important that instructions are followed carefully. Candidates should make sure that they understand the difference in meaning of the command words such as state, suggest, predict, justify, describe, explain, compare and evaluate.
- Candidates should avoid repeating the question in their answers to avoid wasting exam time.
- Candidates should show all working out in calculation questions as credit may be available for the correct calculation method even if the final answer is incorrect.

General comments

There was generally a weak response to all questions in the paper and performance was uneven across the two sections of the paper. Some candidates did not answer **Question 2** (succession and farming) as well as they answered **Question 1** (food webs and net primary productivity). Topics which proved more challenging were net primary productivity, succession and comparison of subsistence and commercial farming.

Few answers showed a good understanding of terms and attention to detail with effective use of exemplar material.

The most successful answers included effective use of appropriate examples to illustrate key points, along with supporting details using appropriate terminology.

Comments on specific questions

Section A

Question 1

This question assessed knowledge and understanding of the effects of marine debris on marine wildlife, food webs and net primary productivity.

(a) (i) Most candidates were able to access the data in **Table 1.1** to give the correct answer of fish.

(ii) Most candidates were able to give the correct answer of birds.

(iii) References to debris coming from fishing or boats was the most common correct answer. A significant number of candidates simply listed types of debris from **Table 1.1** rather than suggesting sources of debris.

(iv) Most candidates were able to use the data in **Table 1.1** to correctly calculate the percentage of all mammals affected by plastic bags as 26%.

(b) (i) Some candidates gained credit for stating correctly that the arrows in the food web in **Fig. 1.1** showed the transfer of energy. Weaker candidates stated that the arrows showed what each species ate.

(ii) This question was generally well answered and assessed knowledge and understanding of food webs. Most candidates were able to gain the majority of the credit available for correctly describing the effect on the food web of the reduction in sea turtle numbers.

(iii) This question was reasonably well answered with most candidates gaining credit. The two most common suggestions were to improve recycling or re-use of plastic bags and to change to paper bags. More successful candidates also considered legislation to reduce single-use bags and developed their answers to suggest why the strategy they had chosen would be effective.

(c) (i) The majority of candidates were able to correctly complete the bar chart in **Fig. 1.2**.

(ii) This question proved challenging for most candidates with very few being able to refer to the lack of sunlight penetrating into the ocean and therefore no photosynthesis. Candidates appeared not to understand the key term of net primary productivity.

(iii) This question proved challenging with very few candidates accessing all of the credit available. Some responses linked the high concentration of nutrients to the use of fertilisers or the river picking up nutrients as it flowed from land to sea. Some candidates did not answer this question.

Question 2

This question assessed knowledge and understanding of succession, abiotic and biotic factors, and subsistence and commercial farming. Some candidates found this question more challenging than **Question 1**.

(a) (i) Very few candidates were able to state the process shown in **Fig. 2.1** as succession.

(ii) This question required the candidates to explain the process of succession using **Fig. 2.1** and proved to be challenging for most. Weaker responses simply described the diagram, mentioning sediments and grasses/shrubs growing. Stronger answers linked sedimentation and evaporation with a build up of nutrients and increase in soil fertility leading to plants colonising the swampy area.

(iii) Some candidates confused abiotic and biotic factors with biotic factors less likely to be correct. Most candidates accessed some of the credit for this question.

(b) (i) Candidates were required to use their knowledge and understanding of commercial farming and link this to loss of local habitats, using the data in **Table 2.1**. Most were able to access credit. The most common response related to use of chemical fertilisers, pesticides and herbicides and the damage they cause.

(ii) Most candidates were successful with loss of food or shelter and disruption to the food web as the most common responses. Very few candidates used the key term ‘monoculture’ in relation to planting crops as a reason for a reduction in biodiversity. Weak answers simply referred to loss of habitat.

(iii) Most candidates did well in this question with the most common responses of education and legislation.

Section B

Question 3 and **Question 5** were almost equally popular while **Question 4** was chosen by fewer candidates. Both **(a)** and **(b)** were equally well attempted with only a small number of candidates not completing both parts.

Question 3

(a) Most candidates were able to explain the advantages and disadvantages of animal breeding programmes and release into National Parks using **Fig. 3.1**. Stronger candidates were able to offer

some balance of advantages and disadvantages in their response. Weaker answers tended to focus more on the disadvantages, copying information from **Fig. 3.1** with only one or two advantages in comparison.

(b) This question assessed knowledge of conservation methods other than animal breeding programmes and release into National Parks. Stronger candidates were able to use a range of examples such as local conservation areas, ecological islands and ecotourism, and critically assess the relative success of each. Weaker candidates tended to list a range of strategies with little development and evaluation.

Question 4

(a) This question proved challenging for some candidates, with responses mainly a description of the trend in the changes in Arctic sea ice extent shown in **Fig. 4.1** with little or no explanation other than global warming. Stronger answers made good use of **Fig. 4.1** and offered a balanced approach.

(b) This question assessed knowledge of a range of international protocols and understanding of the difficulty in achieving and monitoring the protocols. The most successful answers demonstrated good knowledge of international protocols, the Montreal Protocol, Kyoto and the Paris Agreement being the most common, and offered good balance with evaluation of the success and the challenges of the protocols. Some responses were very generalised with no reference to international protocols. Weaker candidates did not show understanding of what protocol meant, and their answers focused on use of fossil fuels in some detail, without addressing the question as set.

Question 5

(a) This question assessed data handling skills with regards to human population from 1800 with a prediction to 2100. Most candidates were able to describe the general trends in the data in **Fig. 5.1** and identified the largest increase in population after 1940. Less successful answers quoted the data with little analysis or explanation. More successful responses provided an explanation of the rapid growth in population as a result of better diets, hygiene and health care leading to a reduced death rate and increased birth rate. They also included reasons for the predicted levelling off and decline from 2040 onwards.

(b) This question was not well answered as many candidates did not answer the question as it was set. Responses focused on describing the effects of an increase in population, such as more cars and therefore more air pollution, rather than the impact on resources and the approaches to provision and preservation of resources. Answers were often quite lengthy and gave some detail but lacked content that addressed the question.

Candidates could have improved their answers by considering infrastructure, political will and population stability and comparing these approaches in countries with different levels of economic development. Stronger candidates provided a balanced answer with evaluative statements and a range of examples or case studies in support.

ENVIRONMENTAL MANAGEMENT

Paper 8291/03
Centre-based Assessment

General comments

November entry was slightly above the previous year and the variation in the range of marks out of 40 was generally between around 10 to 40; most were in the 20 to 35 range which is again very similar to the previous June 2021 series. Candidates selecting the same or a similar topic, evidenced independent data processing and reporting skills, and there appeared no issue of plagiarism demonstrating centres adherence in providing good individual guidance to students in this area.

There were a number of candidate reports that achieved marks in the 32 to 40 mark range, which continued to demonstrate an excellent approach to the organisation and structuring of projects; whilst at the same time providing strong evidence of collected and collated primary data, often combining this with secondary data sources. In the main full marks were generally not achieved due to not evidencing use of an appropriate data analysis statistical tool; or providing a clear and reflective evaluation of the investigation, i.e. strengths or weaknesses of the study in terms of their executed methodology.

A significant number of the higher achieving candidates clearly demonstrated the ability to balance and combine secondary data in support of their primary data when discussing and forming conclusions to their study. This clearly evidences a very rigorous report and one that embraces current scientific studies and theories very relevant to their own study.

There also appears a good correlation to achieving a high mark, where candidates have submitted detailed sources of references in support of their environmental proposals. It should also be noted that the same correlation appears to apply with the submission of a detailed and considered methodology as evidenced in their outline proposal form prior to undertaking the investigation.

Other issues are as follows:

- Leniency, particularly in assessment criteria: **C2 (a)** and **(e)**; **C3 (a)** and **(b)**, is common; two marks being awarded for each criteria when one is better.
- Credit is still being given for criteria not actually present in project reports, e.g. no credit can be given for use of a statistical tool when one has not been used, nor can two marks be given for conclusions that do not relate to the candidates specific data.
- Where projects tend to rely on secondary data only, reports can be overly long at times and extend beyond the syllabus word count. Candidates need to be careful here in respect of providing a clear and concise report that aligns with criteria **C2(c)** and **C2(d)**.

Though there are many project reports now evidencing an excellent approach towards organisation and structuring of their coursework in a logical order: introduction, methods (justified), results and analysis, conclusion and evaluation; there are still a few candidates submitting essentially an extended essay on a particular topic. It is extremely important that centres as well as candidates recognise the difference between a research report and an extended essay, given the range of assessment criteria. The use of section or chapter headings as well as a contents page are often evidenced in candidates achieving overall marks in the 32–40 range.

Although this is a repeat of previous reports, please note the following as a useful checklist for candidates:

- will my hypothesis or question actually yield viable results?
- are my methods realistic, practical and relevant; do they include data recording, collation and presentational techniques?
- are the results and analyses fully representative of the methods referred to the previous section?
- does my conclusion, sum up and relate my results to the original hypothesis or question?
- have I evaluated my work in terms of both its successful features and its limitations; what can be done to improve my work?

As seen in previous years, there were a few administrative errors, it is vital centres check and ensure the correct mark from the Coursework summary form has been entered correctly on the MS1 form for each candidate, this should be a mark out of 40. Note also when awarding marks, the use of half marks is not permitted.

In just a few cases, the sample work sent for moderation purposes at Cambridge did not contain a Candidate Record Sheet, this made the task for centre moderation much more difficult to assess application and consistency of applying the marking criteria.

Comments on assessment criteria

Skill C1

Most candidates performed well in this skill area, and there was often an excellent level of detail demonstrated surrounding the background knowledge in relation to the hypothesis or research question.

Either as the project title, or as part of an introduction, hypotheses or questions were stated by most candidates, frequently being clearly written and not implicit to the introduction. This should be noted, as a significant number of candidates will conclude that their hypothesis was correct, yet there is no evidence anywhere in the script of a research question or hypothesis. Candidates invariably achieving a high mark often include the location of the hypothesis within a contents page.

Stating and justifying a methodology was in the main adequate. Good quality research requires the formulation of a plan, detailing research sites, equipment, expected data and how it will be collated and presented. Candidates need to recognise that a detailed methodology is crucial when testing their hypothesis or answering their research question (**C1(c)**); without this element, there is the risk that the report will become an extended essay, thereby interfering with the achievement of **C2** criteria.

Where the reports had a limited methodology, which was often a brief list without any explanation or justification; it can be difficult to judge whether or not their methodology would be effective in testing their hypothesis or answering their question. Candidates should not rely on the assumptions of an assessor in this aspect, **C1(c)**.

Skill C2

Achievement in **C2** was very similar to previous sessions, thus it is only necessary to reiterate that which has been stated before.

In achieving full marks for **C2(a)** candidates need to make sure all graphs and tables are clearly presented, this includes labelling all axes as well as providing a title. Graphs were sometimes inappropriate for the type of data to be represented; line graphs are suited to continuous data and bar graphs for discrete data. Graphs should have axes containing labelled units and both lines and bars should be easily interpreted. Where candidates are using secondary data in the form of graphs, it is really important for them to reference them correctly to avoid any issue of plagiarism; in addition, if the project solely relies on secondary data, it is really important that candidates process that data using their own skills. Copying and pasting a graph from a source without any attempt at processing data will result in **C2(a)** not achieving the full marks.

There are a limited number of candidate reports that are better described as extended essays and contain very little data presented in the form of graphs and/or tables. As a result, it was difficult to achieve marks in any criteria that required reference to data; this also negating use of a statistical tool **C2(e)**. Often these reports are heavily reliant upon photographic evidence with a limited amount of quantitative data or any evidenced. This factor reduces the marks available for the associated criteria. It is better that photographic

evidence supplements other forms of information. Wherever possible when including photographic evidence, images should be labelled otherwise they have no meaning to the reader; this is often the case where candidates conduct a plant growth trial, includes images of the treatments but do not label them.

Another common issue evidenced when working towards **C2(a)**, is the use of questionnaires, while a pie chart evidencing the responses is fine, candidates should note that stronger investigative reports align a graph more closely to the hypothesis or research question. Using a pie chart to show the proportion of a survey that answers 'yes' or 'no' to a closed question makes for a lengthy report often exceeding the definitive word count.

The use of a statistical tool is still a weakness. There is a difference between statistical methods that are used to describe data and statistical tools that are used to analyse data. Candidates need to consider the nature of the data and select an appropriate statistical test chosen. A simple mean is unlikely to yield appropriate analysis, unless it is backed up with graphical representation and/or further processing, for full marks arithmetical averages must be reflected in the candidates conclusions or discussions. While some candidates evidence excellent use of a t-test or standard deviation, there are still unfortunately some centres still awarding this mark when there is no evidence at all of a statistical tool.

The majority of candidates generally deserved full credit for the general organisation of their work and the quality of written communication **C2(c)** and **C2(d)**.

Skill C3

It still continues to be the case, that this important skill frequently forms the weakest part of a candidate's work. The main weakness in **C3(a)**, the conclusion, is a lack of reference to the data presented in the report. **C3(b)** is also often very limited, as only a small number of candidates referred to related environmental management principles; yet the full two marks were given when one mark was appropriate. This element also needs reference to the actual data within the report.

Some centres still need to inform their candidates that the evaluation needs to be a brief summary of those things that went well and not so well, i.e. success and limitations. There is still confusion between an evaluation and a conclusion. Some candidates still appear to evaluate their secondary data, instead of appraising their methodology (success and limitations of the methodology **C3(c)**). A relatively small number still do not include an evaluation for criteria **C3(c)**. It would be greatly appreciated if centre staff can make certain candidates are aware of these expectations. Candidates may well find the checklist useful within the general comments section of this report.

Concluding comments

The evidence with regard to candidate report submissions, demonstrates a clear and enthusiastic engagement with this element of the environmental management syllabus, in which candidates are given the opportunity to research a topic of their choice. It is extremely pleasing to see that the selection of topics continues to focus on some very key and current environmental issues at a local level, such as the issue of plastic waste, wildfires, or issues of water pollution in relation to excessive fertiliser application to name a few.

Centres must provide very close guidance in respect of their project title, as a significant number of candidates try and review global data (often in relation to climate change) which is an extremely challenging topic given the assessment criteria and word count. In addition a significant number of candidates base their project on climate change and the frequency of hurricanes; whilst the topic is valid, the sheer scope of the study is all too often too large to comply with the word count in addition to the associated level of drawing conclusions in a relatively short time span. Careful consideration must be undertaken in order that the title is not too broad in scope, which can often at times limit the testing of the hypothesis effectively. Occasionally more than one hypothesis was evidenced, and candidates again need to be aware that this may also have an impact in respect of their methodology **C1(c)**, in it being able to securely test <u>all</u> hypotheses. It is the centres responsibility to provide close guidance at the project proposal stage.

In addition to the topic, there is the opportunity to learn some research techniques and put them into practice. As in previous sessions the better topics and final reports are derived from locally based research and the utilisation of primary data often being supported with secondary data.

Thanks must be given to all teachers and assessors for their continued work in making this element of the examination syllabus a success, and also for compliance in the majority of cases to the Cambridge International administrative aspects.