



Cambridge International AS Level

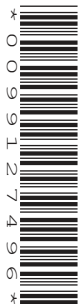
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ENVIRONMENTAL MANAGEMENT

8291/22

Paper 2 Hydrosphere and Biosphere

October/November 2021

1 hour 30 minutes

You must answer **Section A** on the question paper and **Section B** on the answer booklet/paper you have been given.

You will need: Answer booklet/paper

INSTRUCTIONS

- Section A: answer **all** questions. Write your answer to each question in the space provided on the question paper.
- Section B: answer **one** question. Write your answer on the separate answer booklet/paper provided.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.
- At the end of the examination, fasten all your work together. Do **not** use staples, paper clips or glue.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].

| For Examiner's use | |
|--------------------|--|
| Section A | |
| 1 | |
| 2 | |
| Section B | |
| Total | |

This document has **16** pages. Any blank pages are indicated.

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Fig. 1.1 shows information about water needed to produce cotton for clothing.

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Fig. 1.1

- (i) Calculate the volume of water in litres used to make jeans for a class of 30 students.

..... litres [1]

- (ii) A volume of 75 000 litres of water is used to produce t-shirts for a class of students.

Calculate the number of people for which this volume would provide drinking water for **one** year.

..... [2]

(iii) Describe the impact of growing cotton on water stores and flows. Use information from Fig. 1.1 to support your answer.

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..... [4]

(b) Fig. 1.2 shows the level of water stress in the top ten cotton producing countries.

Water stress is when the demand for water exceeds supply.

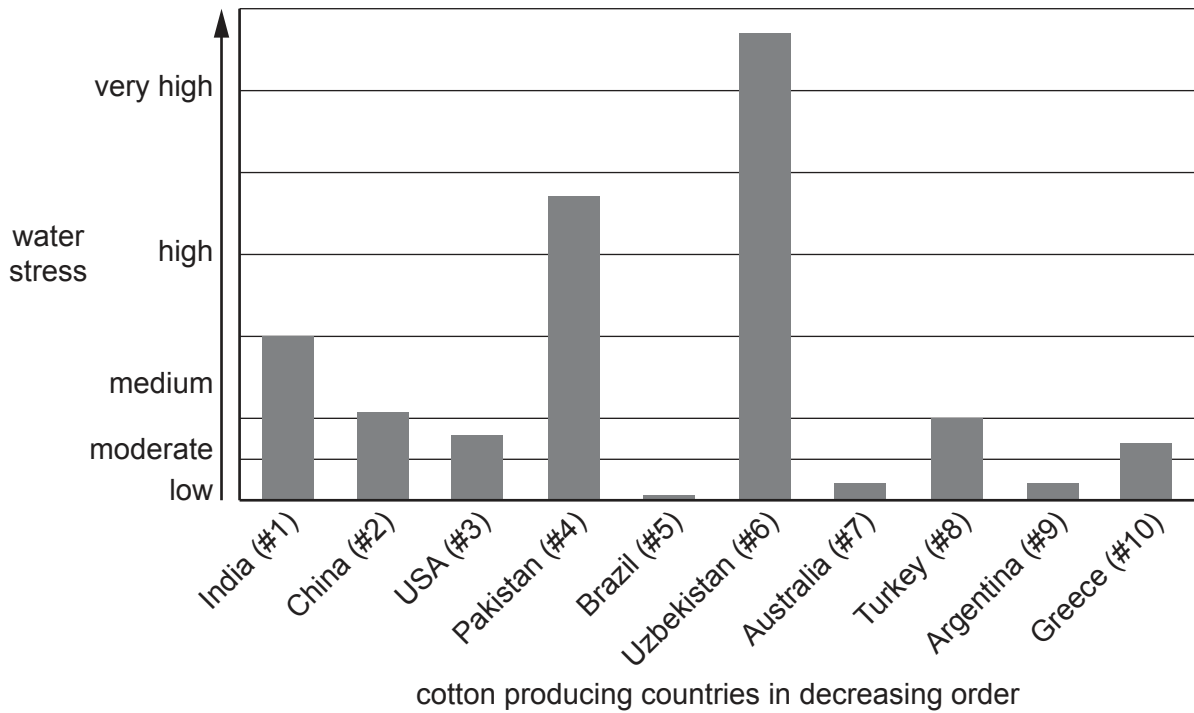


Fig. 1.2

(i) Discuss what is shown by the data in Fig. 1.2.

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..... [3]

(ii) Water use for China in 2019 was 598.1 billion m³. The total renewable water resources available in 2019 were 2840 billion m³.

Calculate the water stress for China in 2019.

Use the formula:

$$\text{water stress} = (\text{water use} \div \text{total renewable water resources available}) \times 100$$

..... % [1]

(c) Fig. 1.3 shows the reduction in size of the Aral Sea located in Uzbekistan and Kazakhstan.

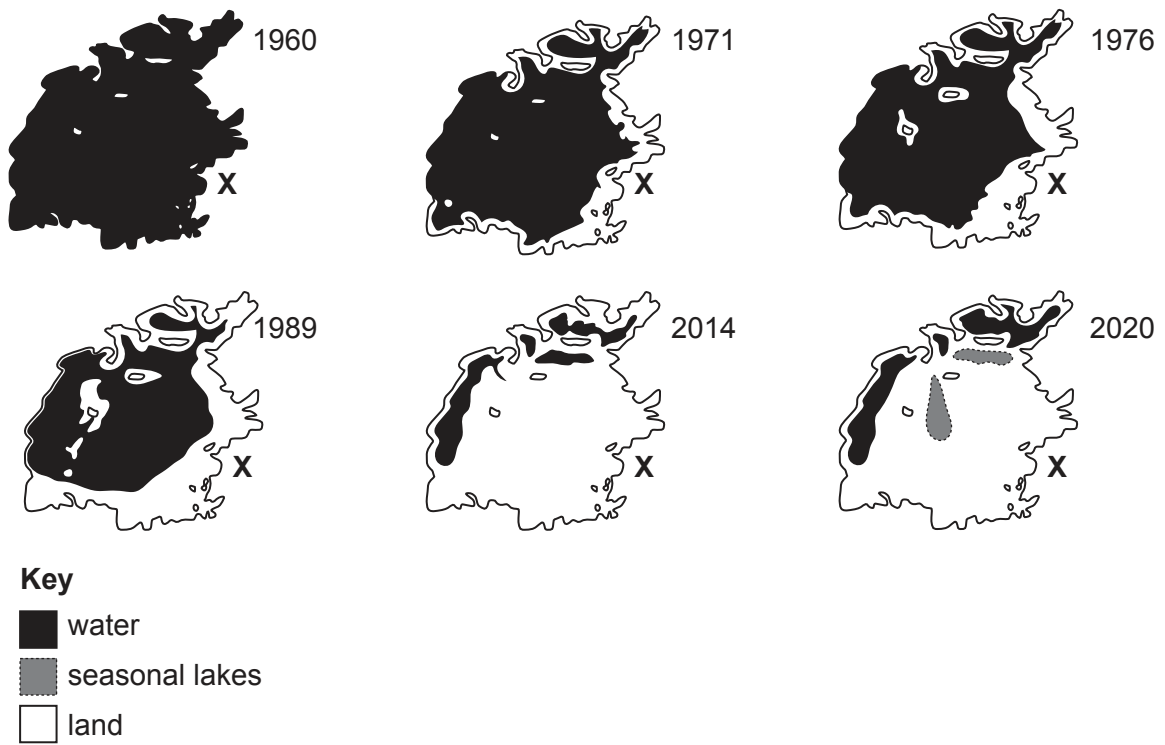


Fig. 1.3

(i) Estimate the percentage loss in area for the Aral Sea between 1960 and 1989 shown in Fig. 1.3.

..... % [1]

(ii) Suggest the impact of the loss of the Aral Sea on people living at location X shown in Fig. 1.3.

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 [2]

(iii) A new dam project is planned to divert water to help increase water levels in the Aral Sea.

Suggest reasons why people may object to the construction of a dam.

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..... [3]

(d) Growing cotton uses more pesticides than any other crop.

Suggest the negative impacts of pesticide use.

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..... [3]

[Total: 20]

2 (a) Fig. 2.1 shows an annual climate graph for Madagascar and the changes in the area of the Madagascar rainforest.

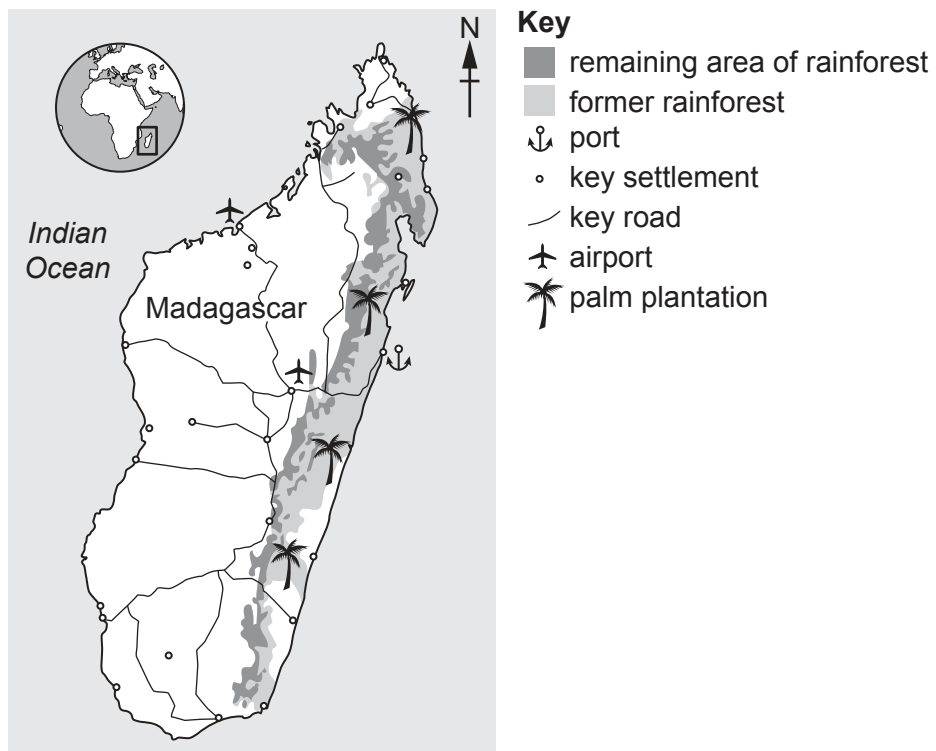
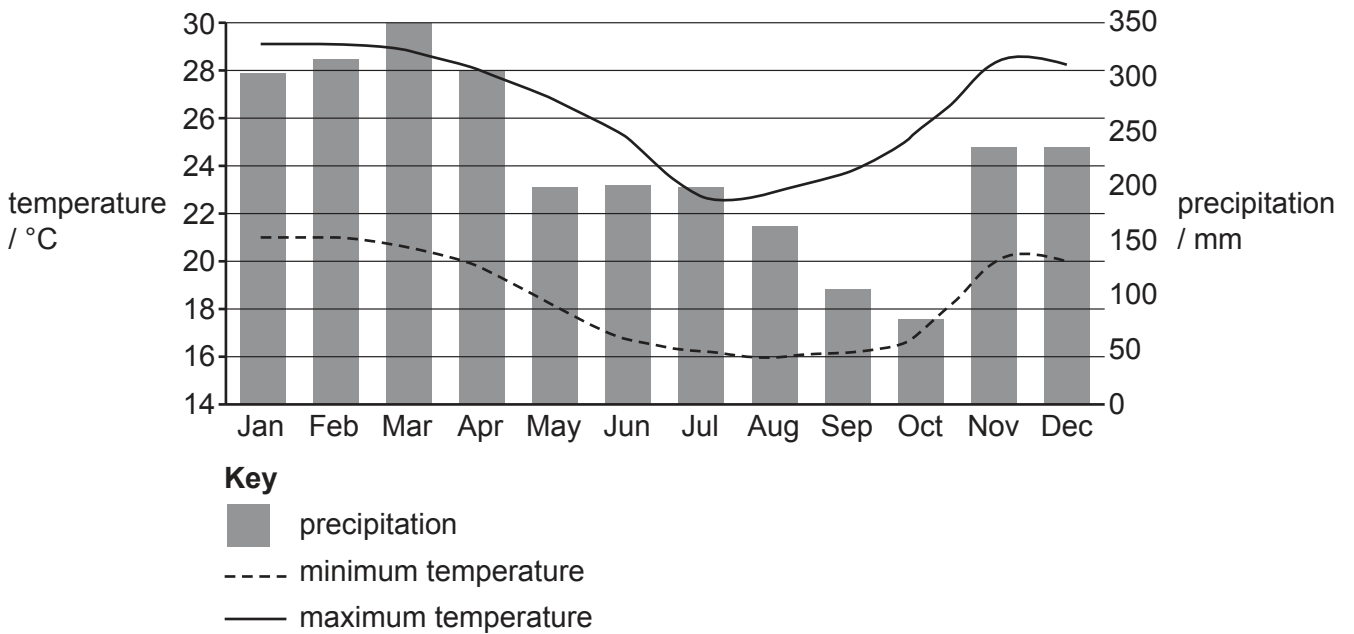


Fig. 2.1

(i) The temperature range is the difference between the highest and lowest value.

State the temperature range for March in Madagascar shown in Fig. 2.1.

..... °C [1]

(ii) State the precipitation for February in Madagascar shown in Fig. 2.1.

..... mm [1]

(iii) Describe the changes in the area of rainforest shown in Fig. 2.1.

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(iv) Suggest reasons for the changes in the area of rainforest shown in Fig. 2.1.

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(v) Explain how the climate of Madagascar affects the productivity of the remaining area of rainforest shown in Fig. 2.1.

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..... [2]

(b) Soil quality has decreased in some parts of Madagascar.

Explain the impacts of decreased soil quality on vegetation.

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..... [4]

(c) Suggest strategies to sustainably manage rainforests in less economically developed countries (LEDCs).

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..... [4]

[Total: 20]

Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

3 Fig. 3.1 shows information about ecotourism in Costa Rica.

Costa Rica, a country in Central America, is a popular ecotourism destination. It has a well-established system of National Parks and protected areas. These cover approximately 23% of the country's land.

Costa Rica is home to a rich variety of flora and fauna. It has only 0.03% of global landmass, but has an estimated 5% of the world's biodiversity.

Over 50% of tourists visiting the country take part in ecotourism, which includes walking, wildlife and bird watching, and visits to rural communities. It is estimated that 13% of Costa Ricans are employed in ecotourism related activities.

Fig. 3.1

- (a) With reference to Fig. 3.1 describe the advantages and disadvantages of ecotourism as a method of conservation. [10]
- (b) Using examples, evaluate the success of National Parks as a method of conservation. [30]

[Total: 40]

- 4 Fig. 4.1 shows sea level change using estimates from the past, actual records and predictions for the future.

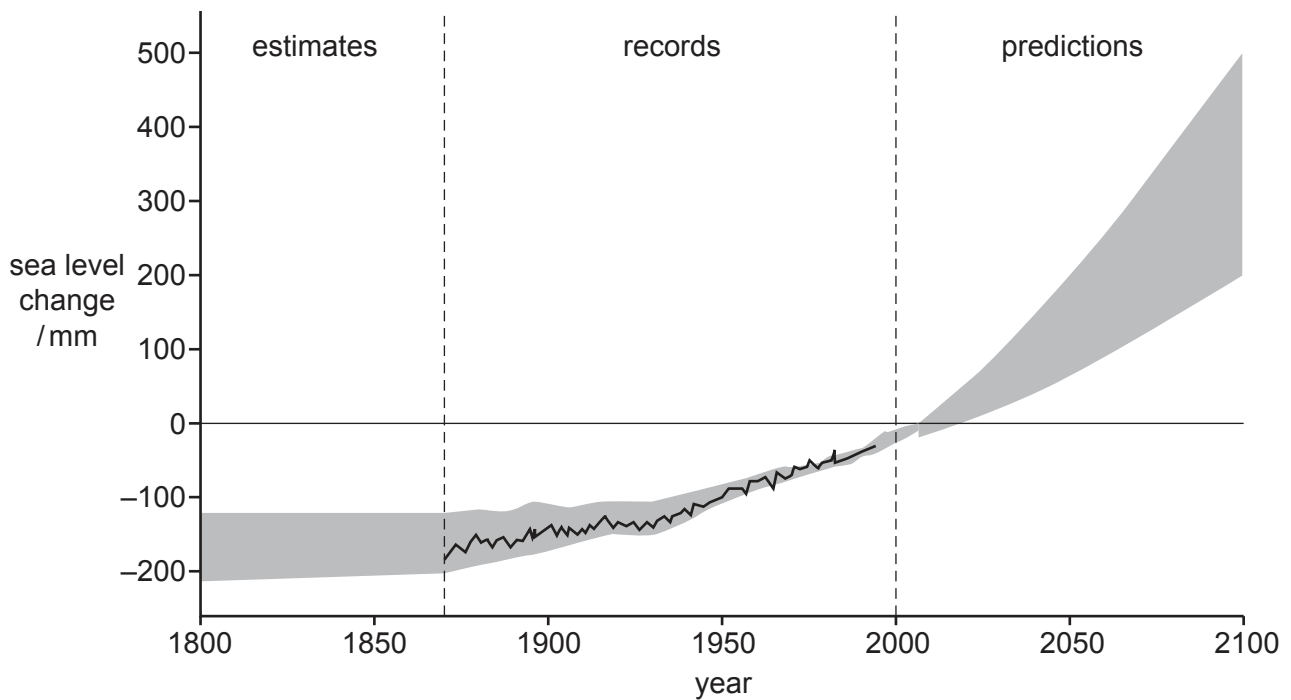


Fig. 4.1

- (a) Describe and explain the data trends in the estimates, actual records and predictions shown in Fig. 4.1. [10]
- (b) To what extent are international protocols successful in managing the causes of sea level change? Use examples to support your answer. [30]

[Total: 40]

- 5 Fig. 5.1 shows predicted percentage change in human population by continent from 2019 to 2100.

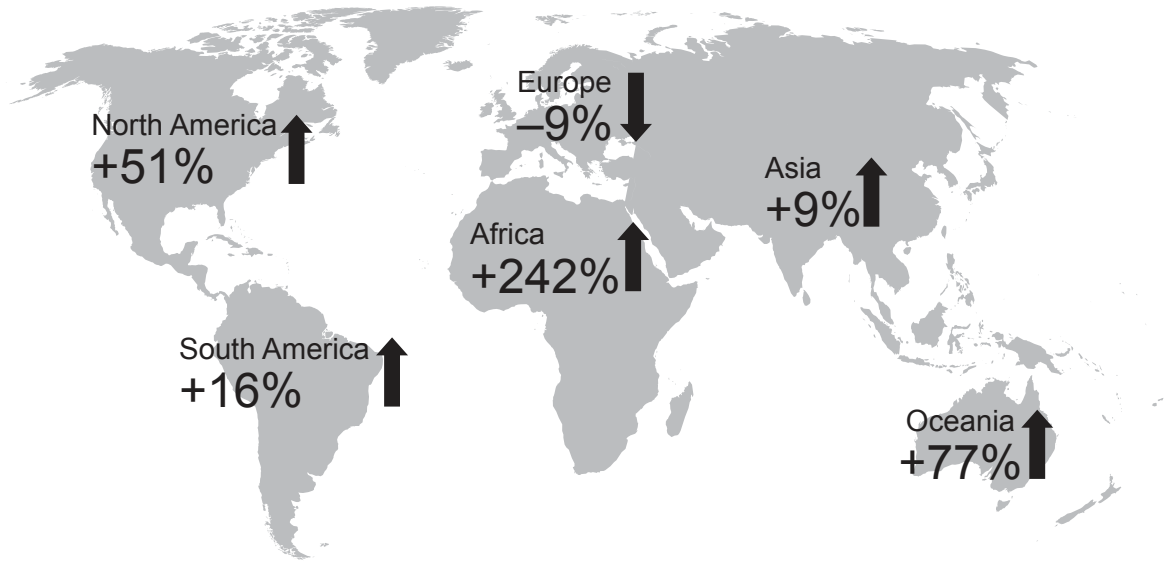


Fig. 5.1

- (a) Describe and explain the predicted percentage change in human population by continent shown in Fig. 5.1. [10]
- (b) An increase in the human population will require agricultural improvements to increase global food production.

Assess the agricultural improvements required to increase food production in countries with contrasting levels of economic development. [30]

[Total: 40]

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