| CANDIDATE NAME | |
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| CENTRE NUMBER | | CANDIDATE NUMBER | |
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**ENVIRONMENTAL MANAGEMENT** **8291/21**

Paper 2  Hydrosphere and Biosphere **May/June 2019**

**1 hour 30 minutes**

Additional Materials:  Answer Booklet/Paper

**READ THESE INSTRUCTIONS FIRST**

Write your centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO **NOT** WRITE IN ANY BARCODES.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

**Section A**

Answer **all** questions in this section.

Write your answers in the spaces provided on the question paper.

**Section B**

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

At the end of the examination,

1.  fasten all separate answer paper securely to the question paper;
2.  enter the question number from Section B in the grid.

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

This document consists of **12** printed pages.

**[Turn over**

## Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 **(a)** Fig. 1.1 shows maps of Bangladesh and the surrounding area. Most of Bangladesh is a low-lying area where floods often occur.
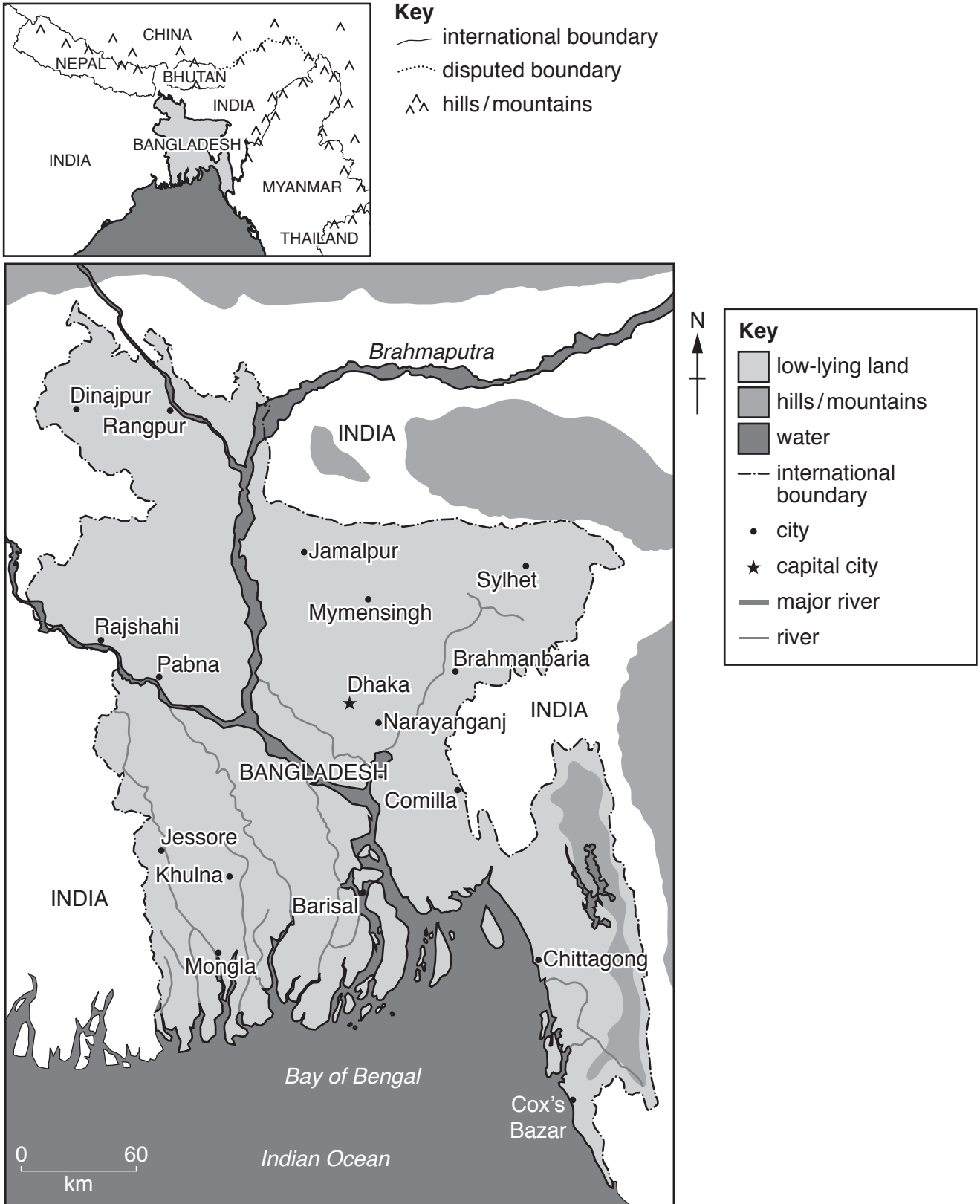


**Fig. 1.1**

**(i)** With reference to Fig. 1.1, suggest how the following human activities could cause flooding in Bangladesh:

increased deforestation in Nepal ................................................................................................

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increased dam building in India ................................................................................................

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increased population in Bangladesh. ................................................................................................

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**(ii)** With reference to Fig. 1.1, suggest the impacts on Bangladesh of rising sea levels due to global warming.

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**(b)** Fig. 1.2 is an internet article about world population growth and water supply.

> The 2009 World Water Development report stated that in 2000, 508 million people inhabited water-scarce regions. The report predicted that the percentage of the world population affected by water scarcity could increase from 8% in 2000 to 47% in 2030. Water scarcity is directly linked to poverty.
>
> World population is expanding by 80 million people per year, increasing the demand for fresh water by about 64 billion $m^3$ a year. Water withdrawals tripled over the last 50 years as a result of population growth. This rapid growth also caused the potential global availability of fresh water to decline.

**Fig. 1.2**

**(i)** Using Fig. 1.2, describe the relationship between human population growth and water scarcity.

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**(ii)** The human population is predicted to be 8.5 billion (8 500 000 000) in 2030. Calculate how many people could be affected by water scarcity according to Fig. 1.2.

.................................................... billion [2]

**(iii)** State what is meant by the term *water demand*.

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**(iv)** Outline **five** ways population growth increases the demand for water.

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[Total: 20]

**2 (a)** Fig. 2.1 is a map of a region of the North West Pacific and a graph showing total input of nitrogen compounds into the sea for the areas marked on the map.

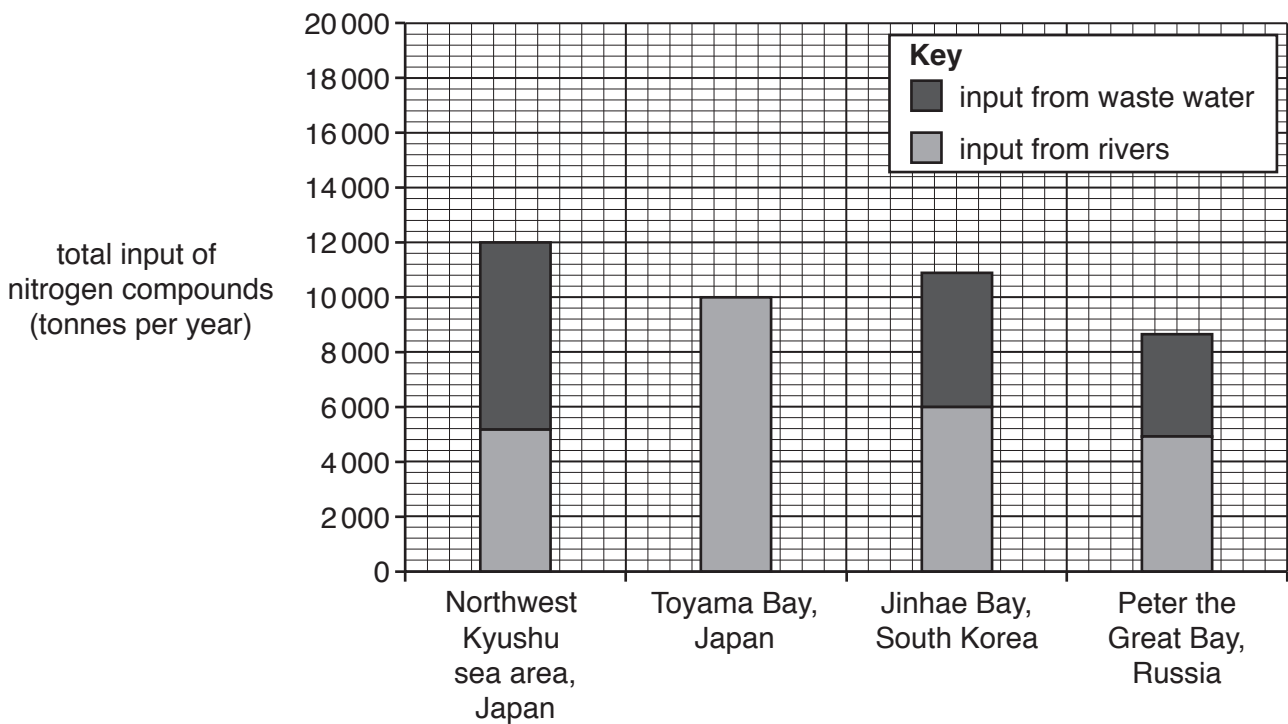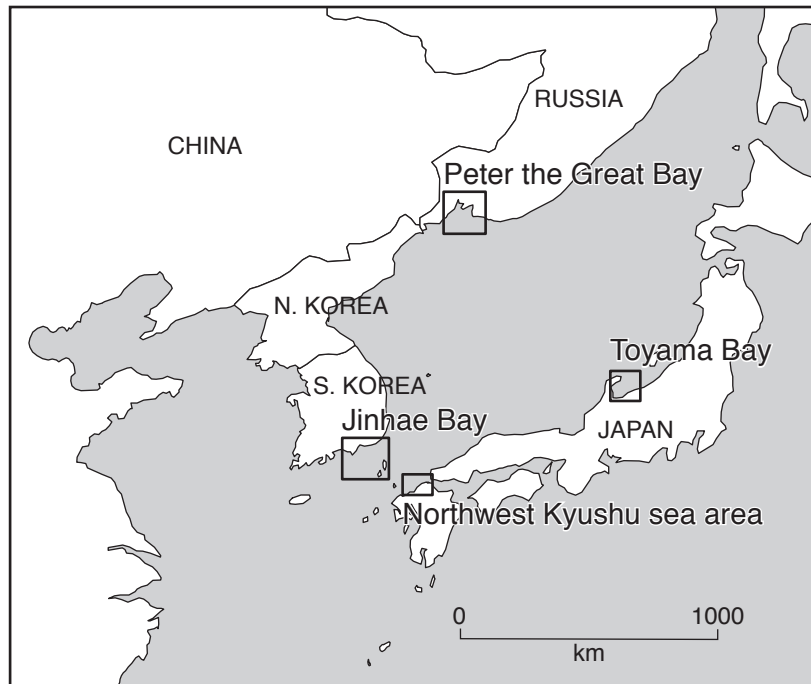Nitrogen compounds can be used as an indicator of the amount of pollution in water.



**Fig. 2.1**

**(i)** Using Fig. 2.1, state which area receives the highest total input of nitrogen compounds from waste water.

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**(ii)** Using Fig. 2.1, calculate the total input of nitrogen compounds from rivers per year into the four areas.

.................... tonnes of nitrogen per year

[2]

**(iii)** Name the process in which pollution of lakes by compounds containing nitrogen and phosphorus leads to algal blooms.

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**(iv)** Explain how the process named in **2(a)(iii)** leads to the loss of biodiversity.

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   **(v)** Suggest **two** human activities that lead to the pollution of water stores.

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      2. .......................................................................................................................................

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**(b)** Fig. 2.2 shows part of a food web for the North West Pacific region shown in Fig. 2.1.
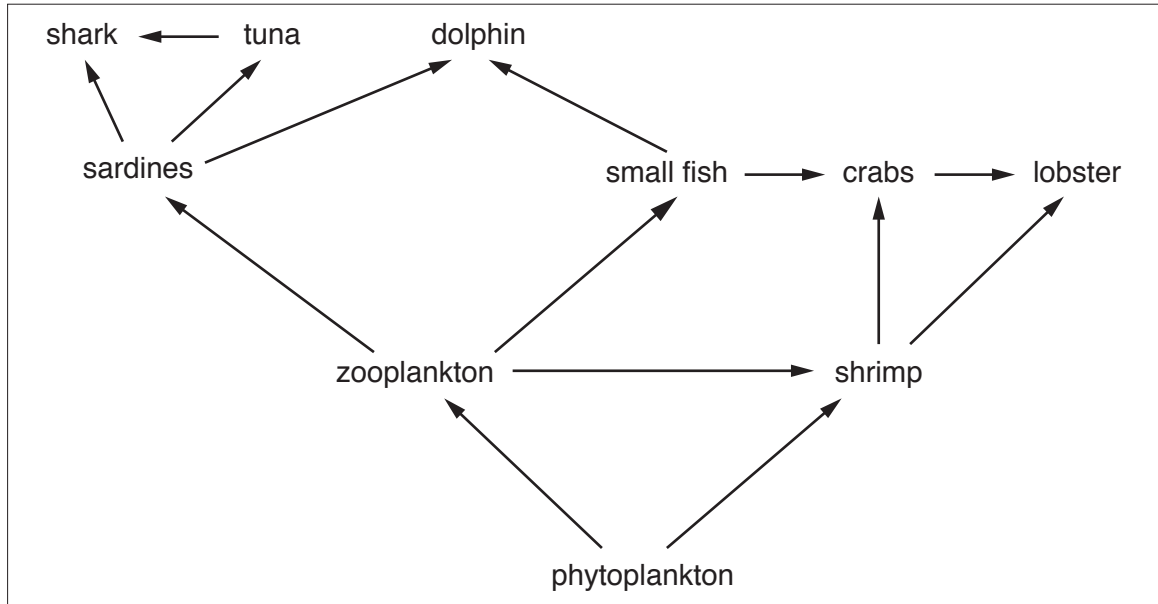


**Fig. 2.2**

   **(i)** State **two** primary consumers shown in Fig. 2.2.

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      ............................................................................................................................... [2]

   **(ii)** Tuna are becoming endangered in this region.

      Suggest **two** possible effects of this on the food web shown in Fig. 2.2.

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      ............................................................................................................................... [2]

**(iii)** Marine ecosystems are under threat from a range of human activities.

Suggest strategies to manage these threats and to conserve these important habitats.

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[Total: 20]

 **[Turn over**

**Section B**

Answer **one** question from this section.

Write your answers on the separate answer paper provided

**3** Fig. 3.1 is a flow diagram showing the effect of human pressure on an ecosystem and the possible management response.
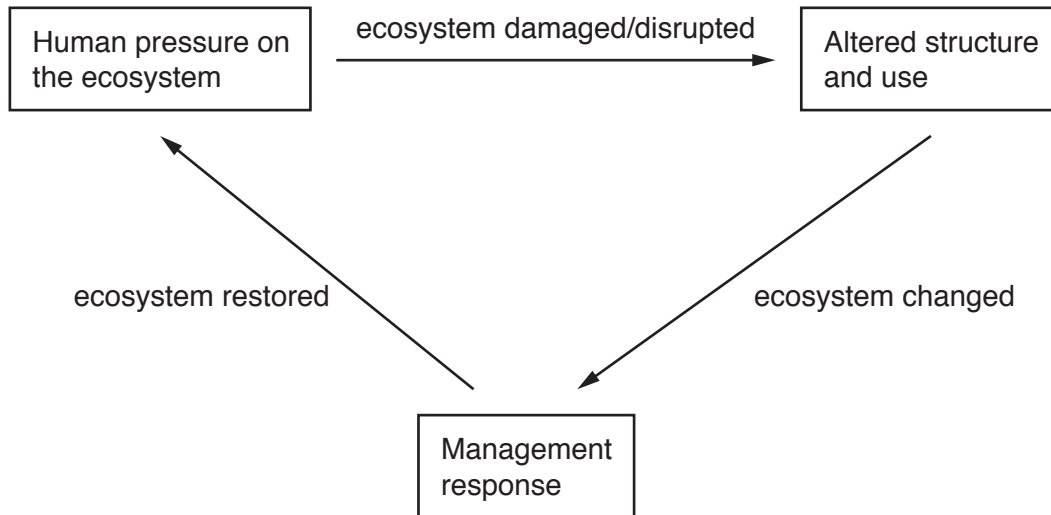


**Fig. 3.1**

**(a)** With reference to Fig. 3.1, describe the effects of human activity on a named terrestrial ecosystem. [10]

**(b)** 'It is important to balance the needs of an increasing population with the need to protect the resources of the biosphere'.

Using examples of countries with contrasting levels of economic development, assess the problems of achieving this balance. [30]

[Total: 40]

**4** Fig. 4.1 is a series of photographs showing changes in the Grinnell Glacier, Montana, USA, between the years 1938 and 1998.



1938                            1981                            1998
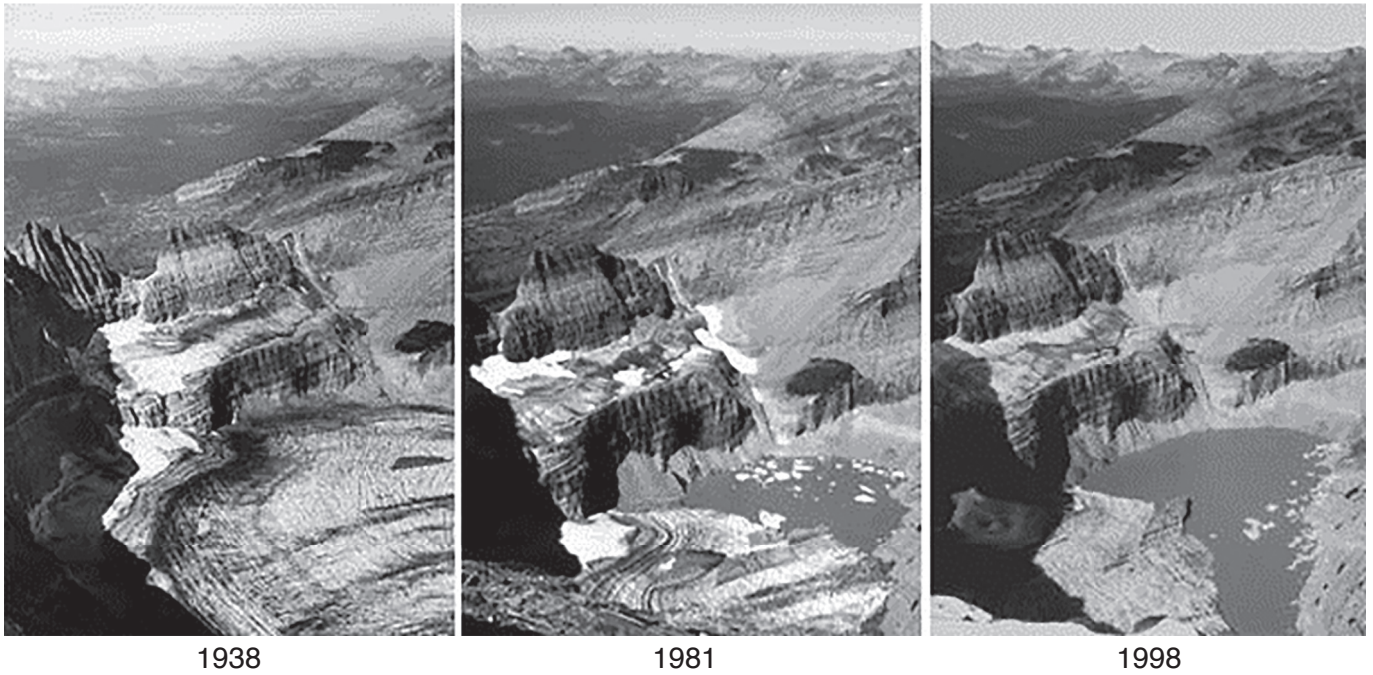
**Fig. 4.1**

**(a)** Suggest how human activities might have led to the loss of the ice store shown in Fig. 4.1. [10]

**(b)** Assess the impact of international protocols on the loss of natural water stores. Describe the difficulties in achieving such agreements. [30]

[Total: 40]

**5** Fig. 5.1 shows details of the tropical rainforests in West and Central Africa.



**Key**

tropical rainforests

Africa

The African tropical rainforests are known for high levels of biodiversity, including more than 600 tree species and 10 000 animal species. Elephants, gorillas and large herbivores keep the number of small trees very low which reduces competition for large trees. But in areas where these animals have been depleted by hunting, forests tend to be denser with small trees. Mature forests in Africa store huge volumes of carbon in their vegetation and tree trunks, serving as an important buffer against climate change.

**Fig. 5.1**

**(a)** Describe the human activities which can lead to the loss of tropical rainforests such as those in Fig. 5.1. [10]

**(b)** Explain how ecotourism can lead to the successful conservation of rainforests. Using examples, assess the advantages and disadvantages of ecotourism projects. [30]

[Total: 40]