



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER



ENVIRONMENTAL MANAGEMENT

0680/22

Paper 2

October/November 2014

1 hour 45 minutes

Candidates answer on the Question Paper.

Additional Materials: Ruler

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.

Answer **both** questions.

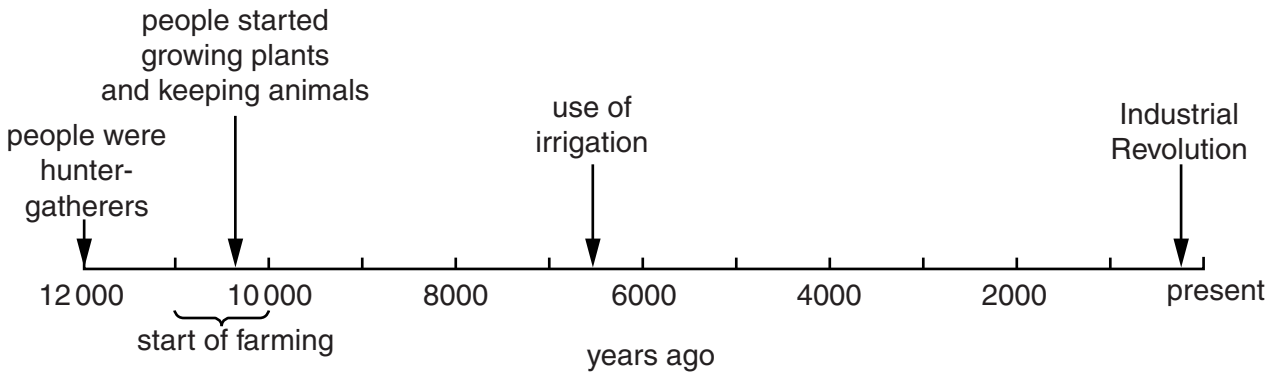
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **18** printed pages and **2** blank pages.

1 (a) Look at the timeline below, showing when major changes in the human way of life occurred.

timeline for major changes in human way of life



(i) Farming (agriculture) began between 10 000 and 11 000 years ago. State and explain the evidence from the timeline for this.

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..... [3]

(ii) Before farming began, humans were hunter-gatherers. What does the term 'hunter-gatherer' mean?

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..... [2]

(iii) Today, there are only a few remaining people who still make their living as hunter-gatherers. Most of them are found in one of these two environments:

- tropical rainforests, such as in the middle of the Amazon Basin
- tundra lands of the Arctic, in the north of North America and Europe

Explain why:

this way of life has survived in these two environments

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only a small total number of people in the world still follow this way of life

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[4]

(iv) Methods of irrigation were first used in the area known as the Fertile Crescent between the Tigris and Euphrates rivers (in present day Iraq in the Middle East).

Knowledge of irrigation spread from here to the Nile Valley (in ancient Egypt), where the methods were improved.

Suggest why the invention of irrigation led to a great increase in food output.

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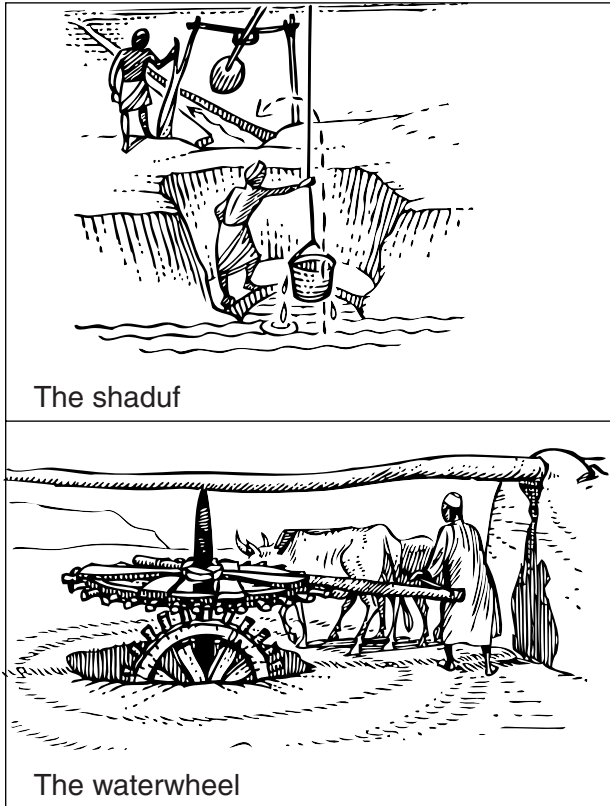
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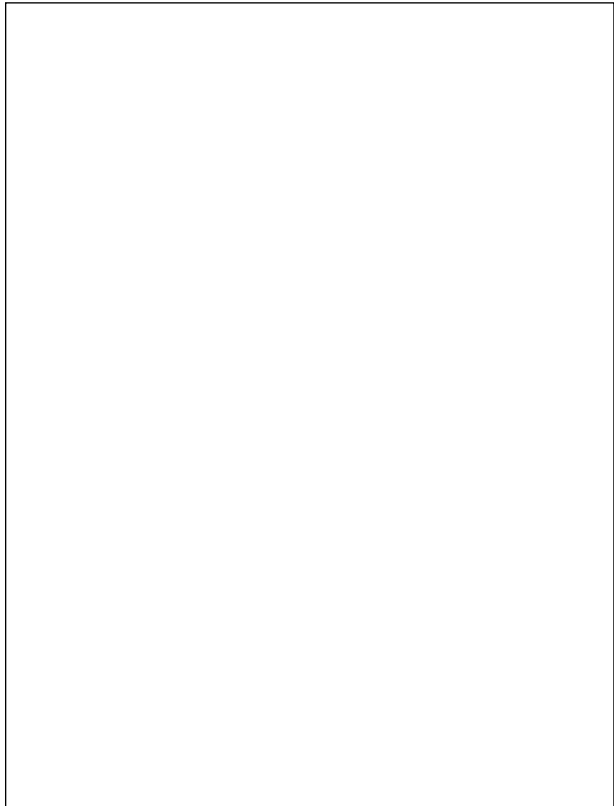
[2]

- (v) The sketches in box A show irrigation methods invented thousands of years ago, which are still in use in some places today.

box A
old methods of irrigation



box B
modern methods of irrigation



In box B, state the name of one modern method of irrigation and draw a labelled sketch to show how it works. [3]

- (vi) State two main advantages for farmers of modern methods of irrigation, such as the one you have drawn in box B, compared with old methods, such as those shown in box A.

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[2]

- (vii) Which is more environmentally sustainable – old methods of irrigation or modern methods?
Explain your answer.

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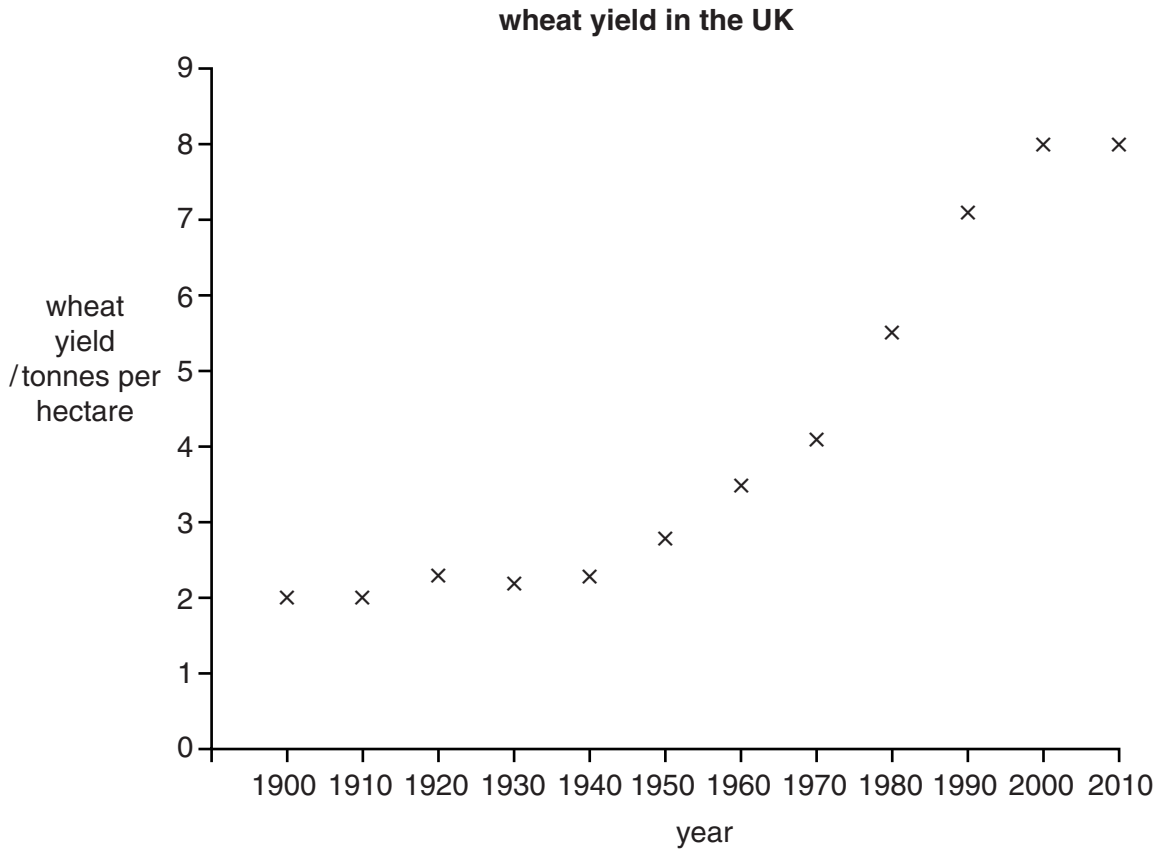
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- (b) Wheat is one of the world’s major (staple) food crops. Look at the graph showing how average wheat yields per hectare in the UK changed between 1900 and 2010.



- (i) On the graph, draw a smooth line of best fit to show the changes in wheat yields in the UK from 1900 to 2010. [1]

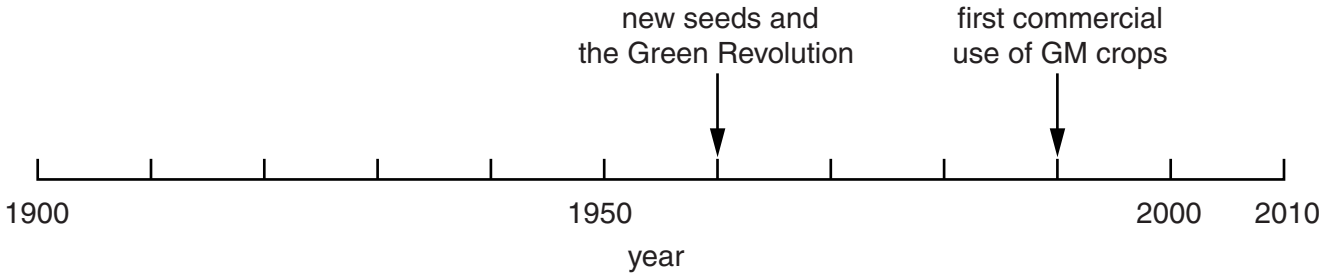
- (ii) Identify the 20 year period during which changes in yield were fastest and greatest. [1]
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- (iii) Using values from the graph on page 5, describe how the rate of change in wheat yields was different in the years earlier than the 20 year period identified in (b)(ii).

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- (iv) Look at the timeline below, which gives more detail about inventions affecting crop farming during the 20th century.

timeline for developments affecting crop farming during the 20th century



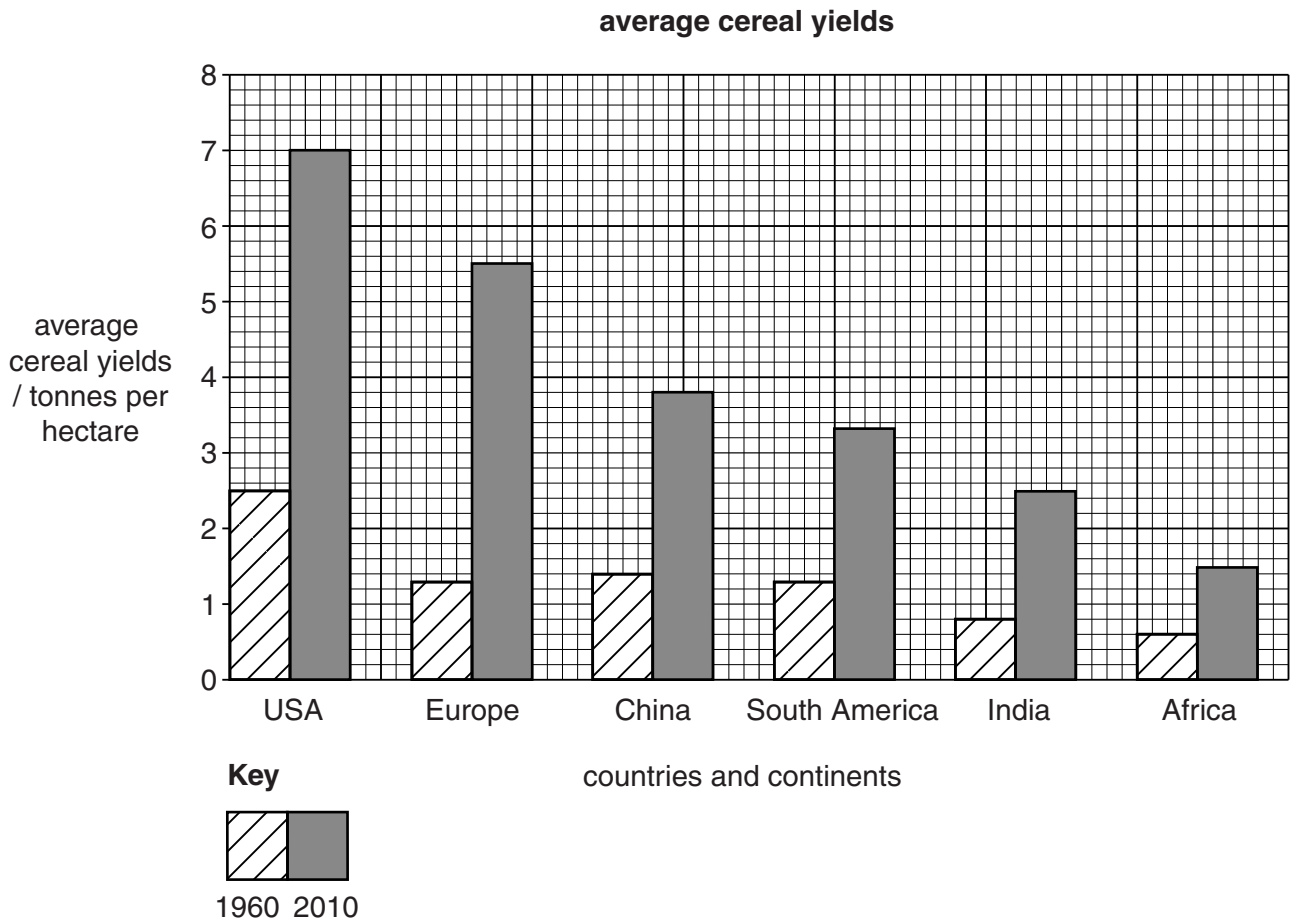
Describe the different ways in which these inventions can increase crop yields per hectare.

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- (v) How does the information in the timeline above, help to explain variations in the rate of change in wheat yields in the UK between 1900 and 2010 that are shown in the graph on page 5?

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..... [1]

- (c) The graph shows the wide variations in average yield of cereals (wheat, barley, rice) between different countries and continents.



- (i) Describe what the graph above shows about agricultural productivity in Africa compared with other continents and countries of the world. Use values from the graph to support your answer.

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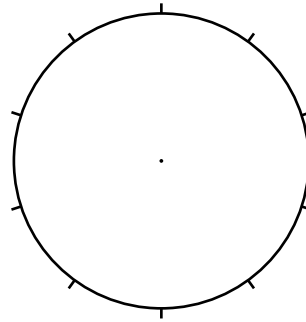
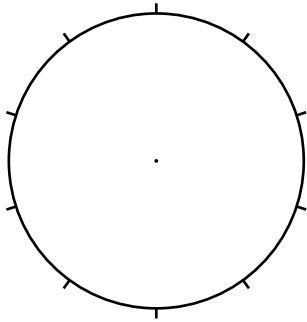
- (ii) In 2010, Africa was home to 15 percent of the world's total population. By 2050, this is expected to increase to 22 percent.

Show these percentages of total world population living in Africa in the pie graphs below and complete the key.

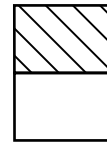
Africa: percentage of total world population

2010

2050



Key



[2]

- (iii) How urgent is the need for increases in agricultural productivity in Africa? Explain your answer.

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(iv) Suggest reasons why the agricultural inventions since 1950, shown in the timeline in (b)(iv), have not led to a big increase in crop yields in all continents and countries.

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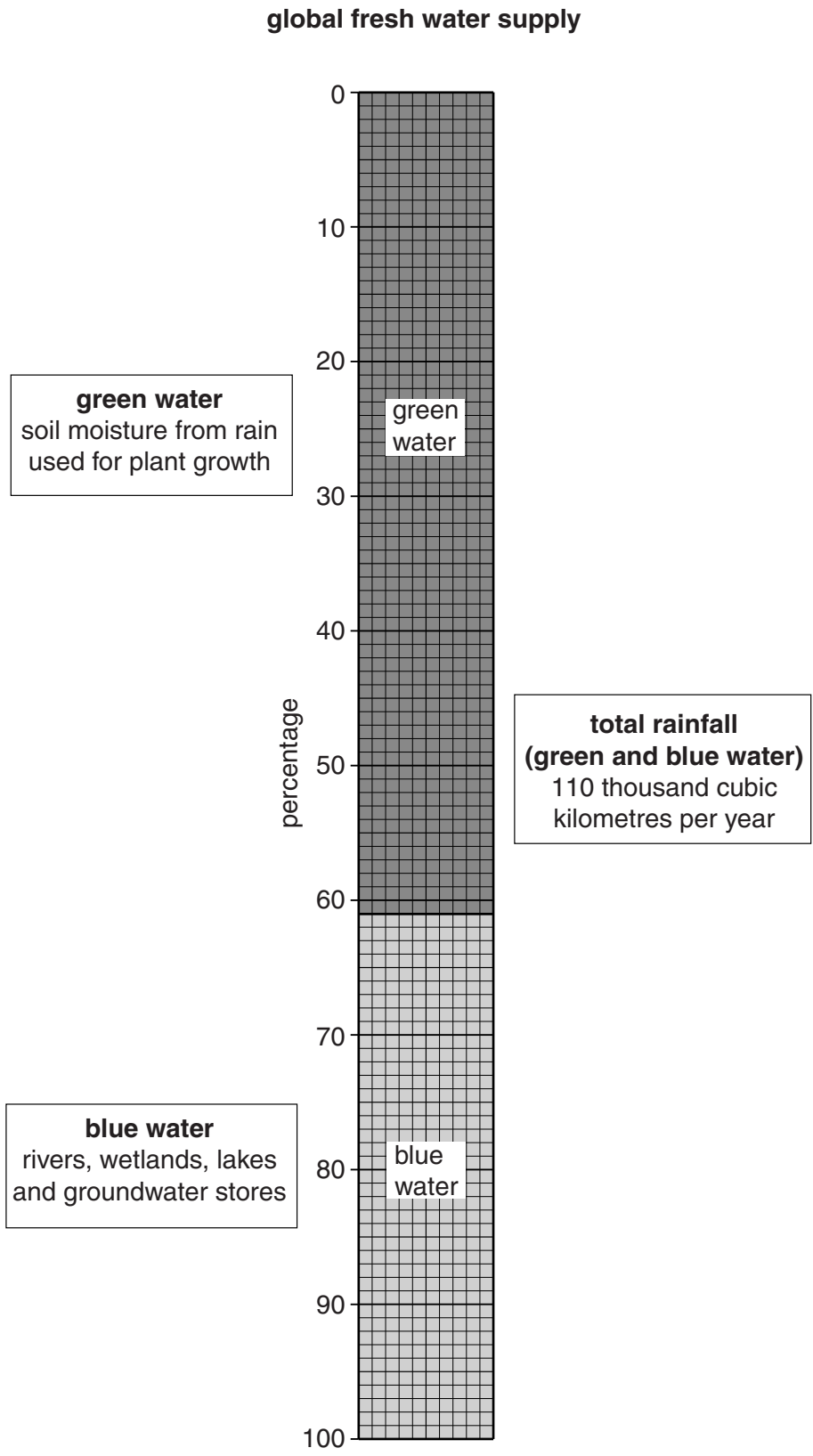
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[Total: 40]

- 2 (a) Look at the diagram below, giving information about what happens to rainfall after it reaches the Earth's surface.



- (i) State the percentage ratio between green and blue water from rainfall.

green water : blue water

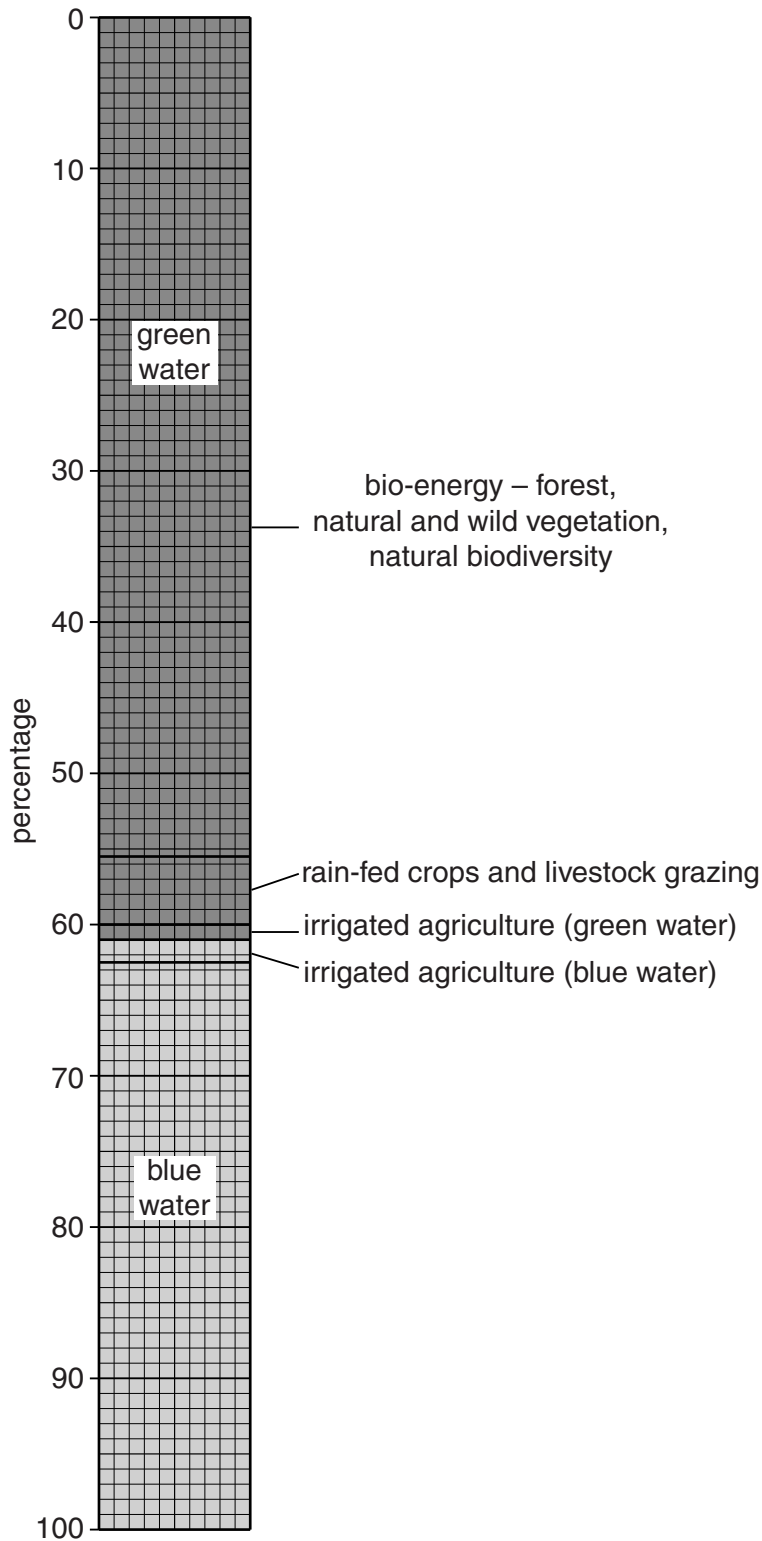
.....% :% [1]

- (ii) Explain the difference between green water and blue water.

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..... [2]

(iii) The divided bar graph below shows how fresh water from rainfall is used.

global fresh water use



Complete the divided bar graph by plotting these percentages for blue water use:

- 1.3%: evaporation
- 0.2%: city and industry use
- 36.0%: reaches the oceans

(iv) What is the percentage of total rainfall that is used in farming?
Show your working.

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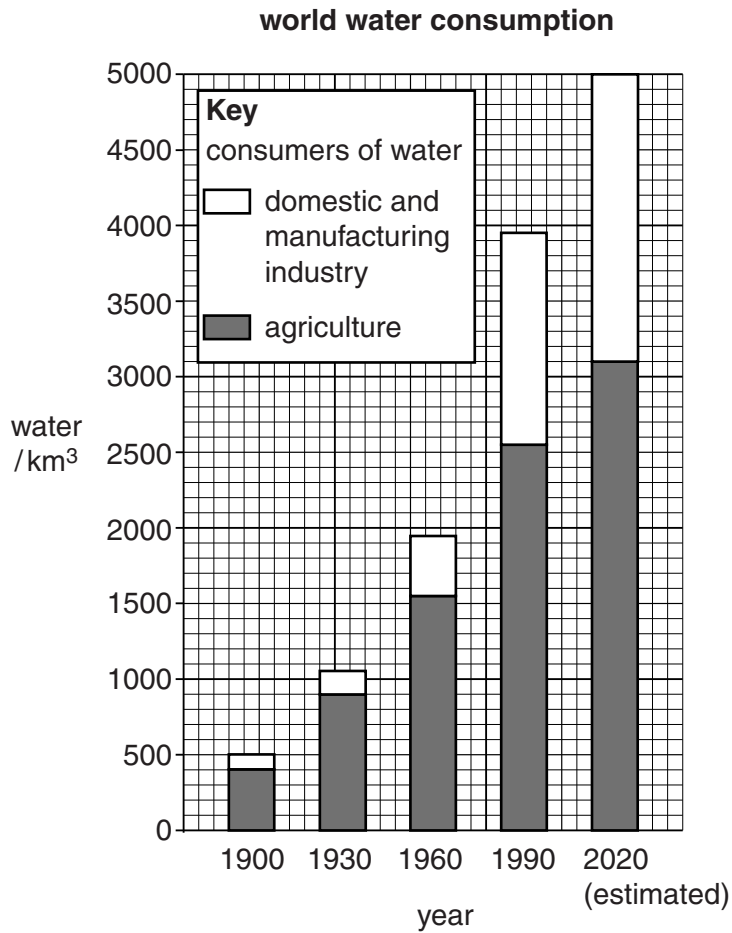
(v) Explain why irrigated agriculture includes water described as both green and blue.

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(vi) How useful and important to humans is the 56% of rainwater used for bio-energy (natural plant growth)? Explain your answer as fully as you can.

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(b) Look at the graph, which gives more information about how people use fresh water.



(i) Describe what the graph shows about known and expected changes in **total** world water consumption since 1900.

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 [2]

(ii) State two different reasons to explain these changes in total water amount consumed.

1

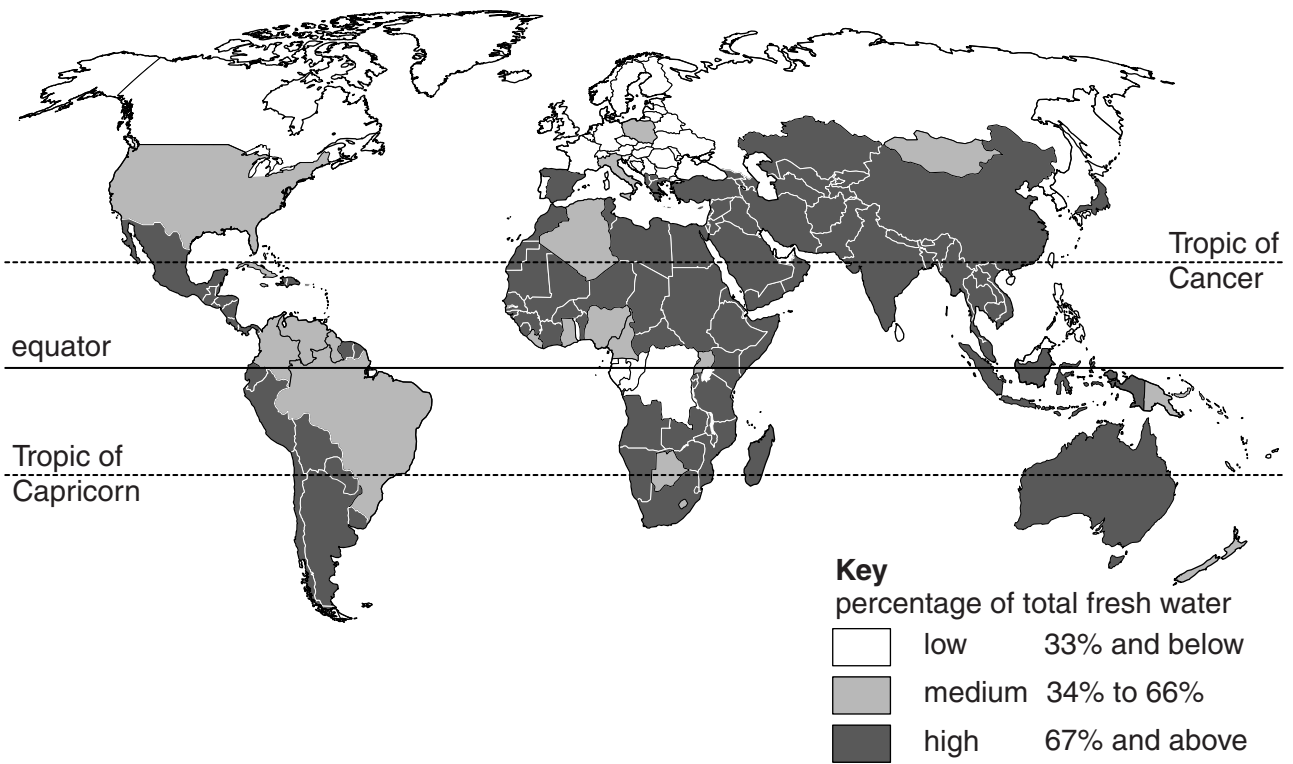
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 [2]

(iii) Describe what the graph shows about water consumption by the agricultural sector compared with other sectors.

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..... [2]

(c) Look at the world map which shows how percentage of fresh water consumption for agriculture varies between countries.

percentage of total national fresh water consumption for agriculture



(i) Using the map, describe areas where water consumption for agriculture is high (67% and above).

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- (ii) Using the map on page 15, describe areas where water consumption for agriculture is low (33% and below).

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- (iii) Suggest reasons for these large variations for water consumption in agriculture. Refer to two countries or areas, one with high use and one with low use, to illustrate your answer.

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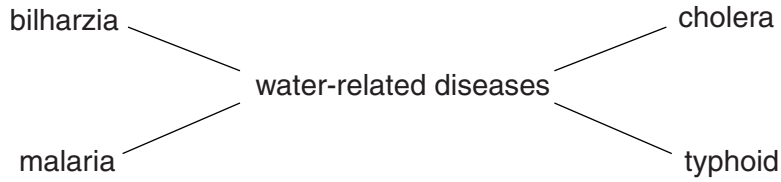
- (d) (i) It is estimated that about 20 percent of the world's irrigated land is affected by salinisation. Explain how salinisation occurs.

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- (ii) Explain how the use of irrigation water can be better managed to reduce the risk of salinisation occurring.

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(e) Storage of water for irrigation increases the amount of surface water, much of it stagnant (still water) or only slow flowing. This increases the risk of water-related diseases affecting farmers and their families, especially in hot tropical latitudes.



(i) The presence of stagnant surface water greatly increases the risk of farmers and their families catching two of the diseases named in the diagram.

Which two water-related diseases are they?

..... [1]

(ii) Explain your choice of diseases in (i).

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..... [2]

(iii) The widespread occurrence of water-related diseases in farming areas where irrigation water is used helps to keep poor farmers in the poverty trap. Explain why.

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(iv) Would you say that the occurrence of water-related diseases is the most important factor keeping many farmers in developing countries in the poverty trap, or do you consider other factors to be more important? Give and explain your view on this.

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[Total: 40]

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Question 1 © G B Redmore; *Under the Southern Cross*; John Murray; 1973.

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