Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

5864276640

ENVIRONMENTAL MANAGEMENT **5014/22**

Paper 2 Management in Context **May/June 2020**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- 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.
- Write your answer to each question in the space provided.
- 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.

INFORMATION

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

This document has **20** pages. Blank pages are indicated.

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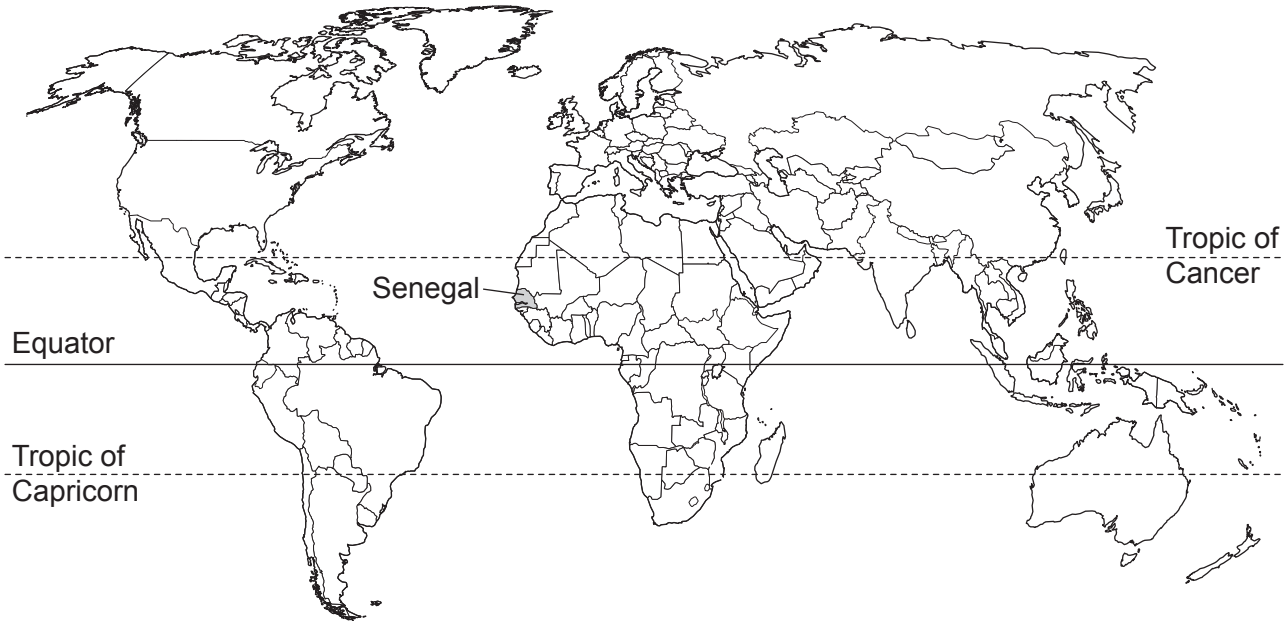
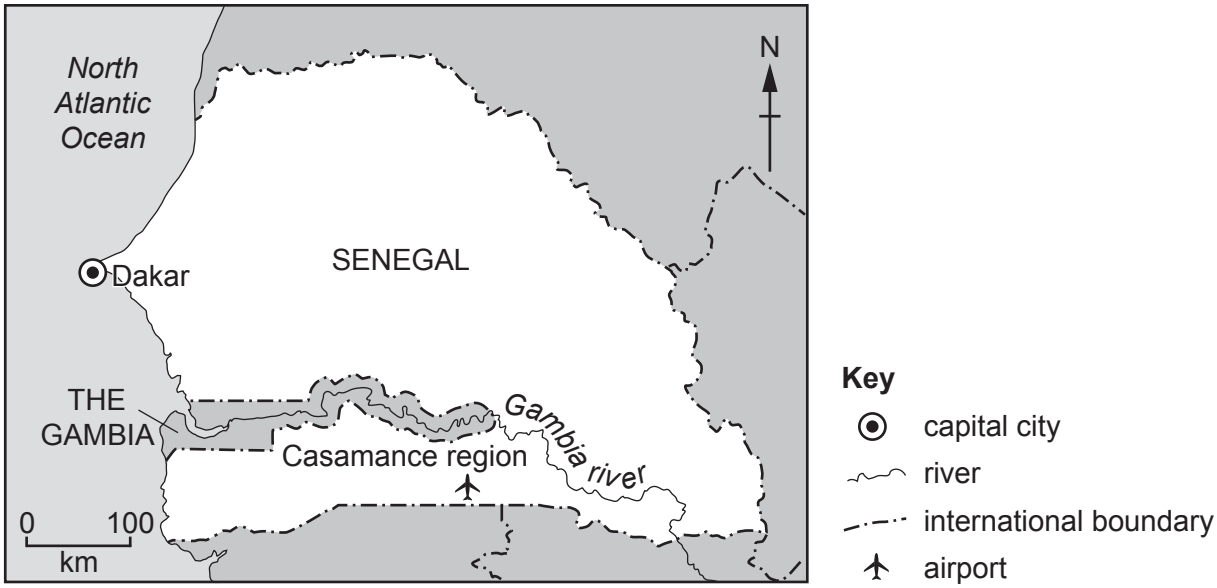
world map showing the location of Senegal



map of Senegal



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Area of Senegal: 196 722 km^2

Population of Senegal: 15.9 million (in 2018)

Children per woman: 4.28

Life expectancy: 62.1 years

Currency: 617 XOF = 1 USD

Languages: French, local languages

Climate of Senegal: tropical in the south, drier in the north, rainy season May to November

Terrain of Senegal: low rolling plains, hills in the south east

Main economic activities: agricultural production, fishing, phosphate mining, oil refining, gold mining

Senegal is a less economically developed country (LEDC) with a rapidly increasing population. 60% of the population is under the age of 25. The government are investing in infrastructure projects and encouraging export businesses. Unemployment remains widespread.

1 **(a)** **(i)** In Senegal, 2% of the population are involved in coastal fishing.

Calculate the number of people in Senegal involved in coastal fishing in 2018.

..... [1]

(ii) Senegal has a rapidly increasing population.

Describe factors that cause changes in human population.

.....

.....

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..... [3]

(iii) Explain why the proportion of the population of Senegal under the age of 25 is likely to continue to increase.

.....

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.....

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.....

..... [3]

(iv) Only 30% of the crops grown in Senegal are consumed in the country.

Suggest what happens to the remaining 70% of crops grown in Senegal.

.....

.....

.....

..... [2]

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(v) Suggest reasons why it is a risk to the population of Senegal to rely on only 30% of the country's crops.

.....

.....

.....

..... [2]

(b) The photograph shows some young mango trees with mango fruits growing on a small farm.

The mango trees are planted in rows 10 m apart.

Suggest reasons why the farmer has planted the mango trees in this way.

.....

.....

.....

..... [2]

(c) The fact sheet shows some information about mango fruits.

Mango fruit fact sheet

- Mango fruits are an important part of the diet in Senegal
- 16 000 tonnes of mango fruits are exported from 2500 small farms
- fertilisers and pesticides are not used on small farms
- mango fruits are harvested between April and September
- the best quality mango fruits are exported from Senegal in July and August
- it is only possible to export mango fruits if they are grown 50 km or less from the capital city, Dakar.

(i) Calculate the average mass of mango fruits exported from each small farm.

..... tonnes [1]

(ii) The Casamance region of Senegal grows mango fruits.

Suggest reasons why farms in the Casamance region cannot export mango fruits.

.....

.....

.....

..... [2]

(iii) A local farmer said,

> In September we always have to leave some mango fruits on the trees. The fruits fall off the trees and rot on the ground.

Explain how leaving the mango fruits to rot on the ground can help fruit production the following year.

.....

.....

.....

..... [2]

(iv) Suggest **one** other reason why farmers leave some mango fruits on the trees in September.

.....

..... [1]

(d) A student visited the Casamance region to investigate mango fruit production on small farms.

The student talked to two farmers.

One farmer said,

> I grow a variety of mango tree called *kent* and export the mango fruits.

The second farmer said,

> I only grow local varieties of mango trees to sell the mango fruits in local markets.

The student selected one box of mango fruits ready to leave each of the farms.

Five fruits were selected and weighed from each box.

The table shows the results.

	***kent* variety**	**local variety**
mango fruit	**mass / g**	**mass / g**
A	484	390
B	522	397
C	546	420
D	510	410
E	543	433
total mass	2605	.....
average mass	521	.....

Complete the table by calculating the total mass and average mass for the local variety of mango fruits. [2]

(e) The student decided to use a questionnaire to find out about mango farms in the Casamance region.

The student selected 18 mango farms.

The results of the questionnaire are shown in the table.

question	results from 18 mango farms						average
How many hectares of mango trees do you have?	1.4	1.5	0.7	2.0	2.2	3.1	1.8
	1.0	1.2	1.7	0.5	0.7	1.9	
	3.2	1.8	2.4	2.5	1.8	1.9	
How many tonnes of mango fruits do you sell?	2.4	4.3	5.1	3.0	4.4	5.2	3.8
	2.1	3.1	4.3	2.0	2.7	3.9	
	5.2	2.8	2.9	2.7	5.6	5.8	
How many local varieties of mango trees do you grow?	2	4	3	1	5	4	3.0
	3	2	4	3	5	1	
	5	2	1	3	2	4	

(i) Select information from the table to complete the statements.

The **smallest** area of mango trees on one farm was ..... ha.

The **largest** mass of mango fruits sold by one farm was ..... tonnes.

The **largest** number of local varieties of mango trees on one farm was ..... . [3]

(ii) Suggest **one** other question the student could have asked the mango farmers.

.....

..... [1]

(iii) The student concluded that most of the farms grow two local varieties of mango fruit.

To what extent do the results support this conclusion?

.....

.....

.....

..... [2]

(iv) Suggest **one** advantage of growing local varieties of mango trees.

.....

..... [1]

(f) The government of Senegal plan to improve many roads that lead to the airport in the Casamance region by 2025.

Suggest how improving roads to the airport could benefit farmers and the government.

benefit to farmers .....

.....

.....

benefit to the government .....

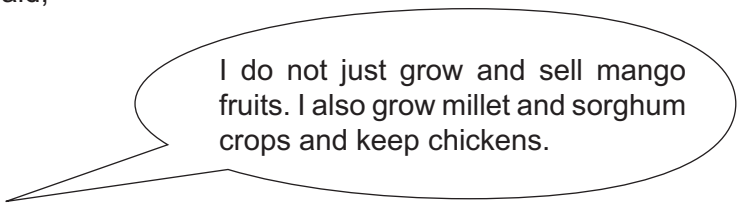
.....

.....
[3]

(g) Food security can be defined as:

'when people have enough food to meet their dietary needs for an active and healthy life.'

One farmer said,



(i) Explain why this farmer is likely to have food security every year.

.....

.....

.....

..... [2]

(ii) Explain ways food security could be lost.

.....

.....

.....

..... [2]

(h) The table shows climate data from a weather station in the Casamance region.

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
average wind speed / km per h	12	13	13	10	11	12	13	11	9	8	9	12
average rainfall / mm	3	3	0	0	10	58	282	500	310	109	18	3

(i) State the months when there is a high risk of soil erosion on farms in this region. Give a reason for your answer.

months .....

reason .....

.....
[2]

(ii) Explain how mango trees can protect against soil erosion on farms in the Casamance region.

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.....

.....

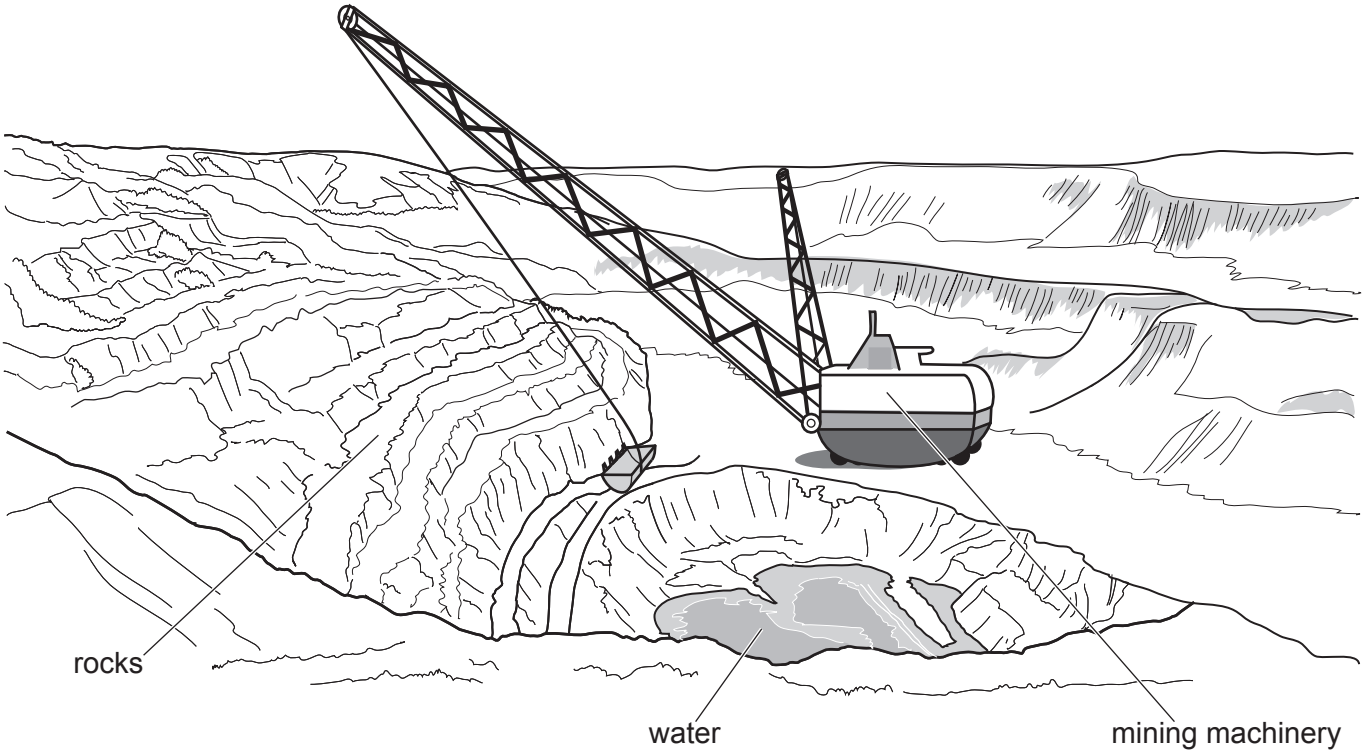
..... [5]

[Total: 42]

2 The geology of Senegal is mostly sedimentary rocks. These include large deposits of phosphate rock.

(a) The drawing shows phosphate rock being mined in Senegal.

Phosphate rock is a valuable export.



(i) Describe the processes involved in the type of mining shown in the drawing.

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..... [3]

(ii) Suggest **one** reason why there is a low risk of water pollution from the mine shown in the drawing.

.....

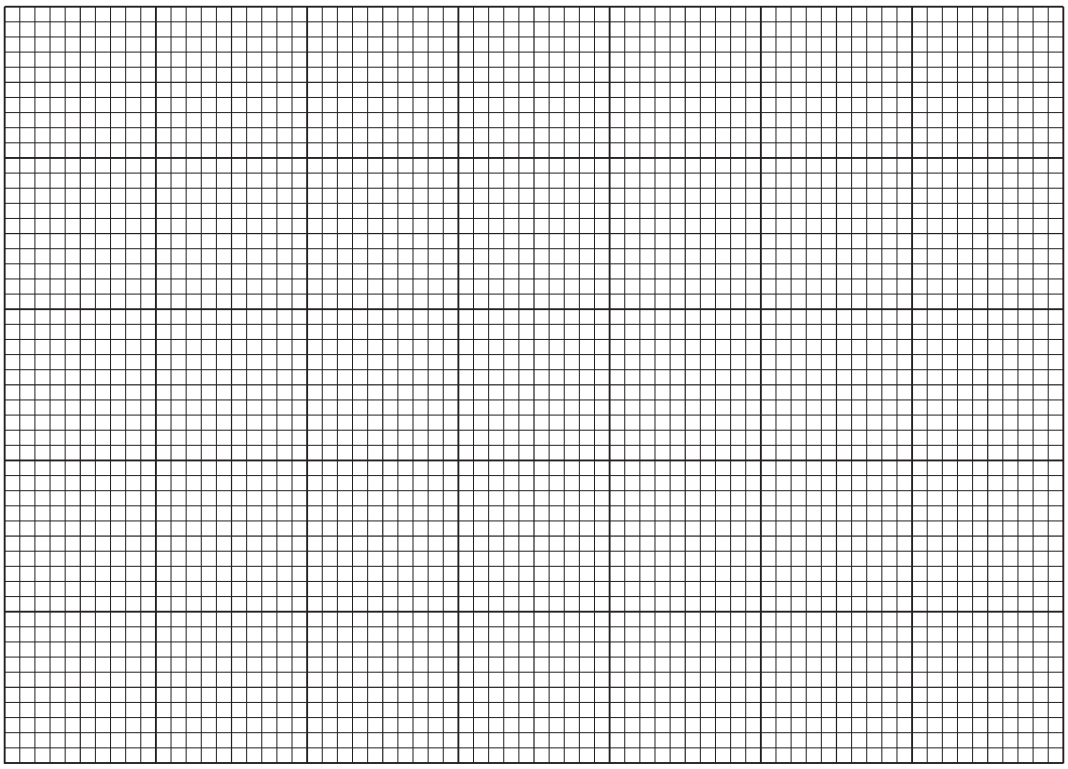
..... [1]

(b) The phosphate rock can be exported or it can be processed into phosphoric acid and then exported.

The table shows the world price of phosphate rock from June 2012 to June 2018.

year	price / USD per tonne
2012	175
2013	131
2014	129
2015	128
2016	126
2017	100
2018	93
average	126

(i) Plot the world price of phosphate rock from 2012 to 2018 as a line graph.



[4]

(ii) Suggest why the price of phosphate rock has decreased since 2012.

.....

..... [1]

(c) Phosphoric acid is used to make fertilisers in many countries.

(i) The average selling price of phosphate rock produced in Senegal was 93 USD per tonne in 2018.

The average selling price of phosphoric acid produced in Senegal was 880 USD per tonne in 2018.

Calculate the percentage increase in value from one tonne of phosphate rock to one tonne of phosphoric acid.

..... % [2]

(ii) Suggest how increasing production of phosphoric acid in Senegal could benefit the government and the people.

benefit to the government .....

.....

.....

benefit to the people .....

.....

.....
[3]

(iii) Name **two** mineral ions, other than phosphate ions, that are found in fertilisers.

1 .....

2 .....
[2]

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(iv) Large quantities of fertiliser are used in agricultural production. Sometimes, excess fertiliser can enter rivers and cause eutrophication.

Describe the impacts of eutrophication on aquatic ecosystems.

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..... [5]

[Total: 21]

3 Some gold deposits have been found in the east of Senegal.

(a) Gold is formed in igneous rocks. When igneous rocks are eroded, small pieces of gold are washed away and redeposited in sedimentary rocks.

Describe the formation of igneous rock.

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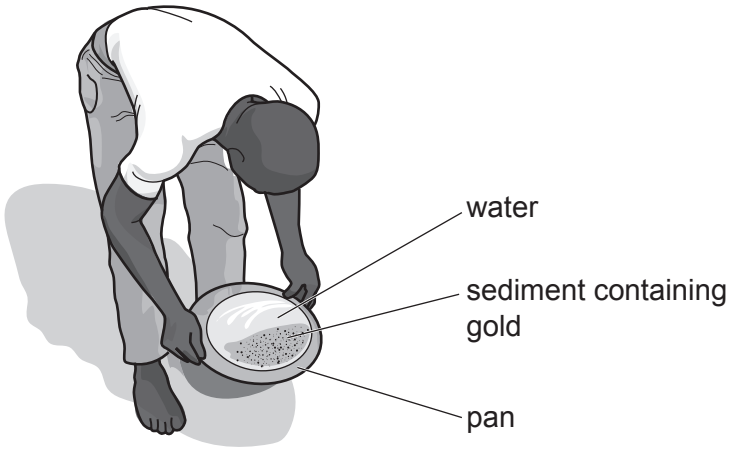
..... [3]

(b) Many local people work in family groups to extract gold from small mines between October and June each year.

One method of finding small pieces of gold is shown in the drawing.



(i) Describe how gold can be extracted by this method.

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..... [2]

(ii) Another method of extracting gold is to use mercury.

Mercury is a toxic metal.

Liquid mercury is mixed with sediment. The mercury combines with the gold and the mixture is easily removed.

The mixture of mercury and gold is then heated to make all the mercury turn to gas.

Mercury costs 14 USD per 100 grams. Gold can be sold for 30 USD per 1 gram.

Suggest reasons why people use mercury to extract gold even when they know mercury is toxic.

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..... [3]

(c) An advisor visited this mining area. The advisor explained to the miners the damage mercury does to human health and to the local river.

(i) Describe the environmental impacts caused by toxic substances, such as mercury, entering a river.

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..... [3]

(ii) The advisor gave the miners a rock-crushing machine and a table-shaker machine. These machines can extract more gold than using mercury.

The advisor trained the miners how to use and maintain these machines.

Suggest reasons why the miners had **not** used these machines before.

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..... [2]

(iii) Suggest reasons why the advisor should keep visiting these miners in the future.

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..... [2]

(iv) The mining families have been extracting gold in this region for many years.

Many miners do not have a mining licence. However, the government has no plans to make this mining illegal.

Suggest reasons why the government does **not** plan to make this mining illegal.

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.....

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..... [2]

[Total: 17]

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