



Cambridge International AS Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

8861692100

ENVIRONMENTAL MANAGEMENT

8291/13

Paper 1 Principles of Environmental Management

May/June 2025

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Section A: answer all questions.
- Section B: answer one question.
- 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 24 pages. Any blank pages are indicated.

water buffalo

Section A

2

Answer all questions in this section.

1 Fig. 1.1 shows subsistence agriculture. The subsistence farmer grows rice in flooded fields.

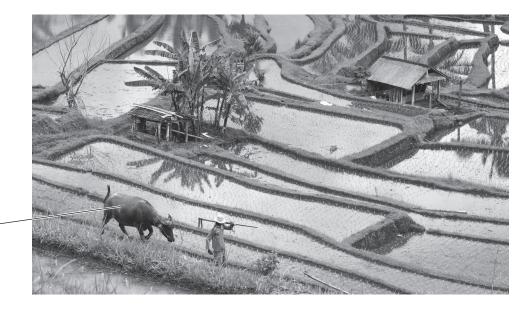


Fig. 1.1

(a)	(i)	Identify three features of subsistence agriculture shown in Fig. 1.1.
		1
		2
		3
		[3]
	(ii)	Subsistence agriculture is one strategy for managing food security.
		Describe two ways that the farmer shown in Fig. 1.1 can improve his food security.
		เวา



(b)

(b)	Ric	e plants are part of the carbon cycle.	
	(i)	Rice plants respire aerobically.	
		State the chemical equation for aerobic respiration.	[2]
	(ii)	The decomposition of rice plants in flooded fields releases methane gas.	[4]
		Explain how methane gas contributes to the enhanced greenhouse effect.	
			[3]
	(iii)	State two ways rice plants are part of the carbon cycle, other than respiration a decomposition.	
		1	
		2	
(-)	\\/a	tou buffele are used in quetainable agriculture	[2]
(c)		ter buffalo are used in sustainable agriculture.	
	Exp	plain two ways that water buffalo improve the sustainability of agriculture.	
			[/]

3

[Total: 16] [Turn over



2 (a) Fig. 2.1 shows a shrew.



Fig. 2.1

A scientist investigates the population of shrews in three different ecosystems using a capture-mark-recapture technique.

Table 2.1 shows the results of the investigation.

Table 2.1

ecosystem	number of individuals captured in first sample n_1	number of individuals (marked and unmarked) captured in second sample n_2	number of marked individuals recaptured in second sample m_2	Lincoln index N
woodland	35	42	5	294
wetland	5	9	1	45
grassland	30	34	2	

(i) Calculate the Lincoln index, N, for the grassland ecosystem using the formula:

$$N = \frac{n_1 \times n_2}{m_2}$$

N = estimate of population size

 n_1 = number of individuals captured in first sample

 n_2 = number of individuals (marked and unmarked) captured in second sample

 m_2 = number of marked individuals recaptured in second sample

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			••
			••
		[1]
	(iii)	A student analysed the data in Table 2.1 and concluded that:	
		'The woodland is more biodiverse than the wetland.'	
		Explain why the student's conclusion may not be valid.	
		[2	2]
(b)		cribe the benefits and limitations of capture-mark-recapture as a technique for estimatin population of shrews.	g
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			••
			••
			••
			••
		[4	 4]
			-

5

Explain why the Lincoln index is an estimate of the population and **not** an exact value.



(c) The 'Living Planet Index' (LPI) measures the mean percentage change in 31821 populations of 5230 species.

The LPI for 1970 is 100% because data was first collected in 1970.

An LPI of 80% indicates that the sizes of the populations of the 5230 species have decreased by an average of 20% since 1970.

Fig. 2.2 shows the LPIs of four different regions between 1970 and 2018.



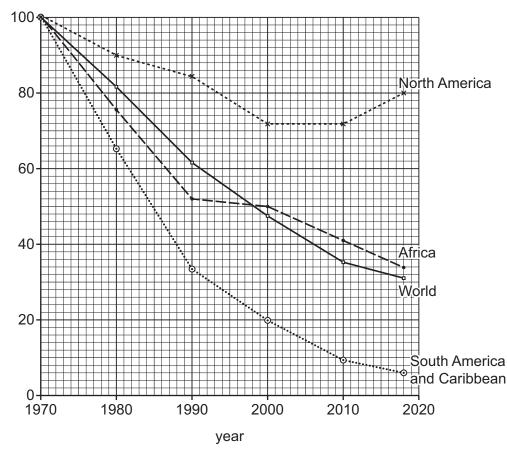


Fig. 2.2

Living Planet Index /% (ii)

	0000007 *
(i)	Describe the changes sho

Describe the changes shown by the data in Fig. 2.2.
[3]
State three benefits of conserving biodiversity.
1
2
3
[3]

7

[Total: 14]



3 Fig. 3.1 shows an oven called a kiln. The kiln uses clay mined locally to make bricks for construction



Fig. 3.1

It is estimated that kilns use 45 000 tonnes of wood every year as a source of energy in Brazil. Most of the wood comes from deforestation of the Amazon rainforest.

The 'Serragem Project' educates local communities about using biomass from seed husks as a source of energy instead of wood.

Fig. 3.2 shows seeds and seed husks.



Fig. 3.2

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	9
(a)	Reducing deforestation is one benefit of using biomass from seed husks as a source of energy.
	Suggest three other benefits of using biomass from seed husks as a source of energy.
	1
	2
	3
	[3]
(b)	Suggest the impacts, other than deforestation, that making bricks using kilns has on the ecosystem.

[1]



(c) Fig. 3.3 shows the year-on-year change in energy production from different resources in Brazil between 2020 and 2021.

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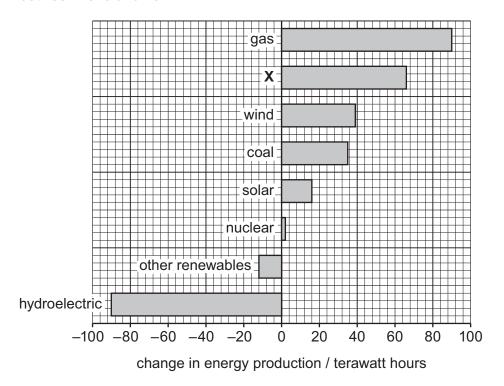


Fig. 3.3

	Suggest the name of resource X .	
/ii\	In Fig. 3.3 hydroplostric has a value of (20 torowatt hours

(ii) In Fig. 3.3, hydroelectric has a value of –90 terawatt hours.

Resource **X** in Fig. 3.3 is non-renewable.

Suggest why this is a negative value.

 [1]

(iii) Use Fig. 3.3 to describe the trend in energy production from non-renewable resources in Brazil between 2020 and 2021.

		[1]

(v)



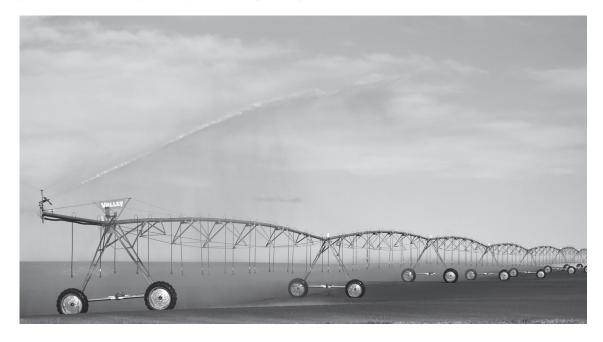
(iv) The Brazilian Government aims to improve energy security.

11

Define energy security.
[3
State three strategies to improve Brazil's energy security.
1
2
3
[3

[Total: 17]

Fig. 4.1 shows an irrigation system for growing wheat.



12

Fig. 4.1

(a)	One limitation	of this type	of irrigation	system is that i	t can cause	soil salinisation.
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Describe the process of soil salinisation.



(ii)	Suggest the	benefits an	d other limi	tations of this	s type o	of irrigation s	vstem
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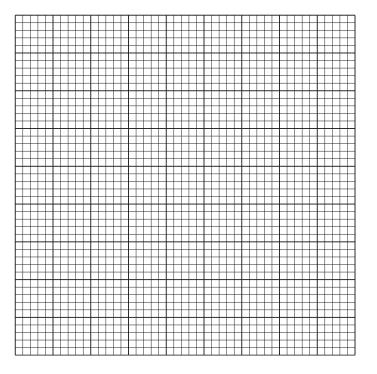
(b) Table 4.1 shows the yields of wheat when different volumes of water are used for irrigation.

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Table 4.1

volume of water for irrigation / m ³ per hectare	yield of wheat /thousand kg per hectare
2000	0.10
3000	0.25
4000	1.00
5000	5.20
6000	7.40
7000	7.60

Plot a line graph to show the yield of wheat against the volume of water for irrigation.



[4]

* 0000800000015 *

(ii)	Explain why crop yield is dependent on water availability.		
	[2]		

[Turn over

[Total: 13]

Section B

Answer one question.

EITHER

5	'Agricultural diseases are the main threat to global food security.'
	To what extent do you agree with this statement?
	Give reasons and include information from relevant examples to support your answer. [20]
OR	
6	Evaluate the success of sustainable water extraction and improved water supply as strategies for managing water security.
	Give reasons and include information from relevant examples to support your answer. [20]

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